OSAKA

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qb 32 | qb 48 | qb 98

REGULATOR AND CONTROLLER

1/16 DIN – 32 x 74 / 48 x 48 / 96 x 48

Manual - V.1

CE

INTRODUCTION

In the manual present there is contained the information necessary for a correct installation and the instructions for the utilization and maintenance of the product, therefore it's recommends to read attentivly the following instructions.

This documentation has realized with supreme care, nevertheless, OSAKA does not assume any responsibility of the use of the same one.

The same thing is said for every person or company involved in the creation of the manual present.

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1 – DESCRIPTION OF EQUIPMENT

1.1– GENERAL DESCRIPTION AND ELECTION TEAM QB

The models QB 32/48/98 are digital regulators with microprocessor to two displays, with regulation ON/OFF, ON/OFF with dead zone, PID with double action (direct and inverse), PID for operations motorized of temporary positioning (The latter in model QB 32/48/98 PLUS (3PT).

For the regulation of the PID, the equipment possesses **AUTOTUNING's** functions **FAST AND NEW SMART TUNNING**, **SELFTUNING** with automatic calculation of the parameter **FUZZY OVESHOOT CONTROL.**

The regulation of the PID relies on a particular algorithm to **TWO LIBERTAD'S DEGREES** that it optimizes in an independent way the services of regulation in presence of disturbances of the process and variations of the SET POINT.

The equipment in addition offers the possibility of possessing an interface of serial communication RS485 protocol of communication MODBUS-RTU and speed of transmission up to 38400 baud. The value of the process is visualized in 4 digits, the value of SET on 4 digits, whereas the condition of the outputs distinguishes itself by 4 leds.

The equipment memorizes up to 4 Set-Points of regulation and can have up to 4 outputs. 3 outputs can be foxgloves with relay and 1 analogical outputs (0/4 … 20mA or 0/2 ... 10V configurable), or up to 4 static outputs (SSR).

The input is multiconfigurable and accepts probes of temperature (thermocouples J, K, S, B, C, And, L, N, R, T; termoresistance Pt100; thermistors PTC, NTC (Only in model QB 32-0); sensors of infrarojo OSAKA IRS) and analog signals normalized (0/4 … 20mA, 0/1 … 5V, 0/2 … 10V, 0 ... 50/60mV, 12 ... 60mV). The equipment has 2 digital incomes for free contact of tension and can have an input for transformer of current for the function of warming of the Break Alarm. Other important functions are:

Function of alarm Loop-Break, limitation of the power of output, limitation of the speed of variation of the power of output, reaching the Set Point to controlled speed, control for two times with time of intermediate maintenance, function Soft-Start, protection of parameters in different levels.

qb³ Line

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MODELOS Y OPCIONES

SOLUCIONES EN REGULACIÓN

qb 32

Modelos

QB 32-0	QB 32	QB 32-RMA

qb 48

Modelos

QB 48	QB 48-RMA

qb 98

Modelos

QB 98	QB 98-RMA

DRIVE SSR

+R (+1 RELÉ)

RAMP

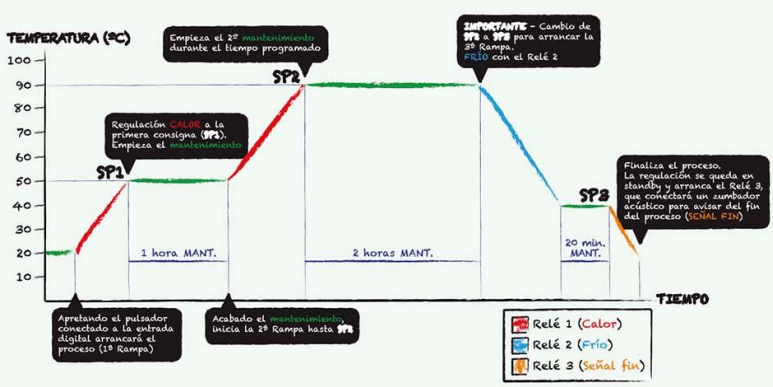
RS485

24 V

PLUS (3PT)

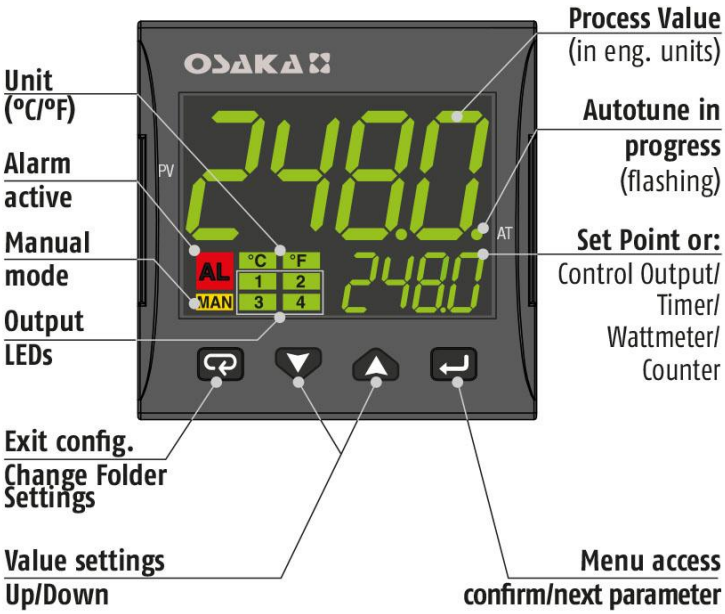
KEY USB

Key USB + OSAKA SetUP


TEMPERATURA (ºC)
100
90
80
70
60
50
40
30
20
10
Empieza el 2º mantenimiento durante el tiempo programado
SP2
IMPORTANTE - Cambio de SP1 a SP2 para arrancar la 2ª Rampa. FRIO con el Relé 2
Regulación CALOR a la primera consigna (SP1). Empieza el mantenimiento
SP1
SP3
Finaliza el proceso. La regulación se queda en standby y arranca el Relé 3, que conectará un zumbador acústico para avisar del fin del proceso (SEÑAL FIN)
1 hora MANT.
2 horas MANT.
20 min. MANT.
TIEMPO
Apretando el pulsador conectado a la entrada digital arrancará el proceso (1ª Rampa)
Acabado el mantenimiento, inicia la 2ª Rampa hasta SP2
Relé 1 (Calor)
Relé 2 (Frío)
Relé 3 (Señal fin)

1.2 – DESCRIPTION OF FRONT PANEL

DISPLAY AND KEYBOARD



KEYS FUNCTIONS

		FUNCTION
↵	Key **ENTER**	Programming / Confirmation + Next Parameter
▼	Key **BAJAR**	Decrease value
▲	Key **SUBIR**	Increase value
↩	Key **PISANI**	Exit configuration SET / Change Folder (Cyclic)

1 – Key ENTER ↵ : Used to accede to the programming of the parameters of functioning and to confirm the selection. Also it advances to the near parameter inside the folder in which he is.
2 – Key DOWN: Decreases the value of the parameter.
3 – Key UP: Increase the parameter value. In automatic mode if you do a click, shows H or C followed by a number. This indicates the power value in % output Heat (H) or Cold (C).
If we wattmeter function activated, the lower display will show U followed by the measured power.

4 – Key PISANI ↩: When in the menu, is used to change folder or for going out of parameters by long press. Key of configurable functioning for the "USrb" parameter. It can be set to: Activate Auto-tuning or Self-tuning, put the computer to manual control, turn off the alarm, change the active Set Point, deactivate control, etc.. (see par. 4.15).
5 - Led OUTPUT1: Indicates the state of output OUT1
6 - Led OUTPUT2: Indicates the state of output OUT2
7 - Led OUTPUT3: Indicates the state of output OUT3
8 - Led OUTPUT4: Indicates the state of output OUT4
9 - Led SET POINT: Indicates Set Point and programming indicates parameter value. (See par. 2.3).
10 - Led AUTOTUNING IN PROGRESS: Indicates that the autotuning / Self-tuning function are operating (flashing).
11 - Measuring PV: Normally indicates the process value.
12 – Unit(°C/°F) : indicates which unit is measuring the temperature.
13 – Alarm: Alarm indication in progress.
14 – Manual mode: indicates that the controller is being controlled in manual mode.

2 - PROGRAMMING

2.1 – FAST SETTING OF SET POINT

Press the "Set" button to confirm, and the display will visualized **"SPn"** (where n is the number of Set Point active at that time) and the programmed value.
To modify press the key "UP" to increase the value or "DOWN" to decrease it.
These keys act with steps of a digit but if they keep pressed for more than one second, the value it increases or decrementa rapidly and, after two seconds in the same condition, the speed increases quickly to reach the wished value.
Once programmed the wished value touching the key "Set" outputs the fast programming mode or passes to the visualization of the slogans of alarm **AL1, AL2, AL3.**
The output of rapid mode putting start of Set is given touching the key "PISANI" or happening for all the parameters of the menu User touching the key ENTER.

2.2 – RESTORE PARAMETERS OF FACTORY

The equipment allows returning to programme the parameters of factory of rapid form, in case it is needed.
To load the parameters of factory they must follow the following steps:
1. Press ENTER key for 5 seconds.
2. In the top display there will display message "PASS" and in the low one he will prove to be 0.
3. Press keys DOWN/ UP and to establish password-481.
4. Press key ENTER.
5. The equipment will go out automatically and will do a reseteo of parameter, showing in the top display the message dFLt. Once the equipment returns to be ignited, the equipment will return to be as the first time that was started.

2.3 – CODE EXPRESS AND PROGRAMMING LEVELS PARAMETER

The new line of equipments QB comes with the new system of the list of programming parameter CODE EXPRESS.
This new tool allows the user to leave the team practically configurated only entering 2 codes of 4 digits.
The following explains how to set parameters via express code:

1- Prees Enter Key ↵ during approximately 3 seconds.
The upper display will show “PASS”.

2- Using the buttons ▲ and ▼ set the password 300 and press Enter ↵.

3- If no previously programmed code, in display shows “**codE”** and “oFF” in the lower display.

4- Press button ↵ for continue.

5- The upper display will show "COD1" while the lower display shows "0000".

6- At this moment it is necessary to choose the wished code of the following, through the up and down keys “▲ and ▼” and then press enter ↵.

cod 1 L M N O cod 1 L M N O

Input Type and Range		L	M
TC J	-50... +1000°C	0	0
TC K	-50... +1370°C	0	1
TC S	-50... 1760°C	0	2
TC R	-50... +1760°C	0	3
TC T	-70... +400°C	0	4
Infrared J	-50... +785°C	0	5
Infrared K	-50... +785°C	0	6
PT 100 / *PTC**	-200... +850°C/-55... +150°C	0	7
PT 1000 / *NTC**	-200... +850°C/-50... +110°C	0	8
Signal 0... 20 mA (this selection force OUT_4 = TX)		1	1
Signal 4... 20 mA (this selection force OUT_4 = TX)		1	2
Signal 0... 5 V		1	3
Signal 1... 5 V		1	4
Signal 0... 10 V		1	5
Signal 2... 10 V		1	6
TC J	-58... +1832°F	1	7
TC K	-58... +2498°F	1	8
TC S	-58... 3200°F	1	9
TC R	-58... +3200°F	2	0
TC T	-94... +752°F	2	1
PT 100	-328... +1562°F/-67... +302°F	2	4
PT 1000	-328... +1562°F/-58... +230°F	2	5

*Note: Inputs *PTC / NTC*, only available for model QB 32-0

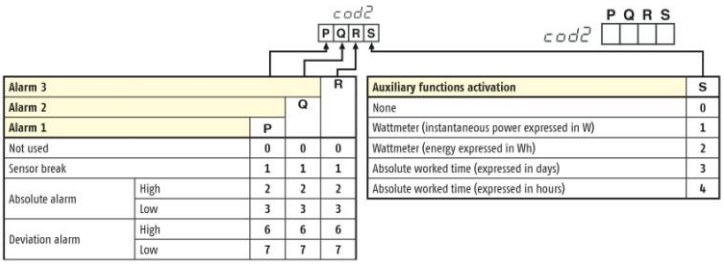
Modo de Control	OUT1	OUT2	OUT3	OUT4	N	O
ON/OFF Heating = H	H	Al1	Al2	Al3	0	0
	NU	Al1	Al2	H	0	1
ON/OFF Cooling = C	C	Al1	Al2	Al3	0	2
	NU	Al1	Al2	C	0	3
ON/OFF Neutral Zone (H/C)	H	C	Al2	Al3	0	4
	H	Al1	Al2	C	0	5
	C	H	Al2	Al3	0	6
	NU	H	Al2	C	0	7
	C	Al1	Al2	H	0	8
	NU	C	Al2	H	0	9
PID Heating = H	H	Al1	Al2	Al3	1	0
	NU	Al1	Al2	H	1	1
PID Cooling = C	C	Al1	Al2	Al3	1	2
	NU	Al1	Al2	C	1	3
PID double action (H/C)	H	C	Al2	Al3	1	4
	H	Al1	Al2	C	1	5
	C	H	Al2	Al3	1	6
	NU	H	Al2	C	1	7
	C	Al1	Al2	H	1	8
	NU	C	Al2	H	1	9

Nota: (column **OUT3** only active in version **PLUS** (4 Outputs).

***Note:** Input PTC/NTC, only it is available in model QB 32-0
Note Control Mode: Column OUT3 only activates in PLUS version (4 Outputs).

Then, the upper display shows "cod2" while the lower display shows "0000" or the value "cod2" stored in memory.

3- Using the buttons and There is established the value of **code2** of agreement by the following tables.



Alarm 3				R
Alarm 2			Q	
Alarm 1		P		
Not used		0	0	0
Sensor break		1	1	1
Absolute alarm	High	2	2	2
	Low	3	3	3
Deviation alarm	High	6	6	6
	Low	7	7	7

Auxiliary functions activation	S
None	0
Wattmeter (instantaneous power expressed in W)	1
Wattmeter (energy expressed in Wh)	2
Absolute worked time (expressed in days)	3
Absolute worked time (expressed in hours)	4

4- Press the button.
If the **codes** that are configured are correct, the upper display shows "CODE" and the bottom shows "Good".

5- Return to press again key. Once you have pressed the equipment will reset and will configure the parameters as has been established in the CODE EXPRESS.

Note:
After using the method of "Code EXPRESS", always it will be possible to modify the parameters using the method of normal configuration. If the value of a parameter among those included in the setup codes (COD1 - cod2) is modified, the change will acquire equipment while the other parameters remain exactly the same.

If we enter into one of the parameters EXPRESS CODE by normal procedure and we vary, the Code EXPRESS will return to mark COD1 - COD 2 = oFF. Only it will return to show his value if it is programmed by CODE EXPRESS.

In case you want to program the equipment Normal shape or want to change some parameter that does not include the Code Express below normal procedure is explained:

The configuration parameters are in different "FOLDERS". Each folder defines all parameters related to a specific function (eg, alarms, outputs, etc).

1. Press the button during approxmately 5 seconds. The upper display will show “PASS” thile the lower display shows “0”.

2. Using the buttons and set the programmed password: by default Password 20 (Operator level) or Password 30 (programmer level: all parameters).

3. Press the button.
If the password is correct, the display will show the name of the first parameter FOLDER preceded by the symbol: .

In other words, the upper display will show: (FOLDER input parameters).

- **PROMOTION PARAMETERS**

An important part of the QB line is that in either model parameters allow you to move the 3 levels of programming you have. Hereby it is possible to come to have a simple equipment for the final user, simple to programme and can avoid badly use of the clients at the moment of touching parameters.

This procedure is called Promotion of parameters.

As we were explaining a bit more above, the equipment has 3 levels of access of parameters:

The first level is the USER'S level.
It is that level where they can accede to the parameters of rapid form without need to enter no type of code of access.

The second level is the Operator's level.
In this level one accedes by means of Password 20 (when shipped from the factory) and it allows us to establish the parameters that are wished but appear linearly.

The third level is the Programmer's level.
In this level one accedes by means of the password 30 (when shipped from factory) and it allows us to accede to all the parameters of the equipment.

As explained a little above, the teams allowed across any of the level move any parameter to our liking.

Later it explains how to do it:

There are 2 ways to market the equipment parameters:

1- Using SET UP OSAKA software + USB KEY (recommended)

2- By means of manual procedure from the same equipment.

If it is wished to programme by the manual procedure do the following:

1. Press the key during more than 3 seconds.
2. The upper display will show “PASS” thile the lower display shows “0”.
3. Press the key or , and between with password -81.
4. Press the key.
The equipment will show the name of the first folder of configuration of parameters InP
5. By means the button Select the folder of the parameter that it wishes to promote.
6. By means the button select the parameter.
7. The upper display will show the parameter name and the lower display will show your current level of promotion. The promotion level is defined by a letter followed by a number:

c: The letter shows that the parameter is accessible only from PROGRAMMER level. In this case the number is forced to zero.
A: The letter shows that the parameter is in the OPERATOR level.
Example: If there is wished that appears the Sens parameter first and Dp second parameter. It must be programmed:
Sens= A1
Dp= A2

o: The letter shows that the parameter is in the USER level. The number that shows is the position where you wish that show the parameter to appear.

8. With the key or this parameter is assigned the desired position.

Note:
If a different value from 0 is established, the letter "c" will change automatically to to and the parameter happens to be automatically the level of limited access.

9. To go the level of USER parameter, press and, maintaining the pressure, press. The letter will change of "A" to "o" changing automatically the level.

10. When you need to go out of the procedure of promotion, press the button and maintain pressure for over 10s. The equipment shows the "standard display".

2.4 – TYPES OF REGULATION

The equipment has 3 operating modes: automatic regulation **(RE**G**)**, Stand-by **(Stand-by)** and manual control **(OPLO).**

The team can move from one state of operation to another in different ways:
- From Oper parameter inside the folder Pan
- From the “PISANI" key conveniently programmed on par. "USrb" ("USrb” = OPLO; “USrb” = St.by) can go from nivel "rEG” the level programmed in the parameter and vice versa.
- From digital input conveniently programmed on par. "DiF” it is possible passed to the "REG” mode to "St.by" mode.
- Default team is active in the "REG” mode.

If any of the three levels is programmed, is scheduled to begin booting the computer with the last programmed mode before shutdown.

AUTOMATIC REGULATION (rEG) - The mode of automatic regulation is the normal way of functioning. During the automatic regulation, it is possible to visualize the regulation power on the display SV pressing the key “ ”.
The values visualizables of power vary of H100 (100 % of power in heat output) to C100 (100 % of power in output of Cold).

DEACTIVATED REGULATION (Stand - by) - East way deactivates the automatic control, and deactivates the outputs of control. In this way the equipment works as an indicator.
When the equipment is in way Stand - by, the top screen will show the measured value, whereas the low screen will show alternately the Set Point and the message "St.bY".

MANUAL REGULATION (OPLO) - This option allows programming manually the percentage of power given in the output of the regulator deactivating the automatic regulation.
When the equipment is activated in manual regulation, the percentage of power that acts is visualized in the top display (SV).
The lower display will show alternately the power of output [preceded for H (for heat action) or C (for action of cold)] and the message OPLO, which also can be modified by the keys “ ” and “ ”.

2.5 – ACTIVE SET POINT SELECTION

The equipment allows to form up to 4 Set Points of regulation ("**SP1**", "**SP2**", "**SP3**", “**SP4**") and to select which of them will be active.
The maximum number of set points comes determined by the parameter **"nSP"** in the folder of parameters “ **SP** “.
The active Set point can be selected:

- For the parameter **"A.SP"** in the group of parameters “ **SP** “.
- By means of the key "PISANI" if the parameter "USrb" = CHSP.
- By means of the digital input suitably programmed across of par. "DiF" ("diF" = 18, 19, 20)

The Set point "SP1", "SP2", "SP3", "SP4", will be visible depending on the maximum number of Set points selected in the parameter "nSP" and will be configured with a value understood between the values programmed in the par. **"SPLL"** and the value programmed in the par. **"SPHL"**.

3 – WARNINGS OF INSTALLATION AND USE

3.1 - USE

The devices are made as measuring and regulating equipment in accordance with EN 61010-1 norm for operation up to an altitude of 2000 mts.
The use of equipment for standard applications not expressly provided in norm cited above, should provide all measurement and adjustments necessary protection.
The equipment must be adequately protected and away from liquids, dust, grease and dirt. They must be accessible only with the use of a right tool and safety system (except the front).
The devices can NOT be used in dangerous environments (flammable or explosive) without adequate protection.
It is recalled that the installer must ensure that the norm for electromagnetic compatibility is respected after implantation in the installation of equipment, eventually using the right filters if is needed.
In case of failure or malfunction of measuring and control equipment that can create dangerous situations or damage to persons, things, animals or products (defrost food or changes in their ideal state), it is recalled that the facility should be equipped with electronic devices or electromechanical safety and warning system.
They should be placed outside the measuring and control equipments, possible protective devices, responding to specific safety requirements that are covered by the norm of the product or suggest the common sense.
For your own safety, is highly recommended fulfilling the instructions provided above.

3.2 – MECHANICAL ASSEMBLY

Requirements

This equipment is designed for a permanent installation, only for use in interiors, in an electrical panel that covers the back framework. The terminals are exposed and the wiring in the part of behind.

Select a location of assembly that has the following characteristics:

1. It must be of easy access;
2. Minimal vibrations and no impact;
3. Without corrosive gases;
4. Without water or other fluids (it is to say, of condensation);
5. Temperature enviroment be according to the operative temperature (0 ... 50°C);
6. The relative dampness be according to the specifications of the equipment (20 ... 85 %);

The equipment can be mounted on the panel, with a maximum 15mm thick.
When the maximum frontal protection (IP65) is desired, the optional board must be installed.

The equipment can be mounted in the panel, with a maximum thickness of 15mm. When is wished the front maximum protection (IP65), the optional meeting it must be installed.

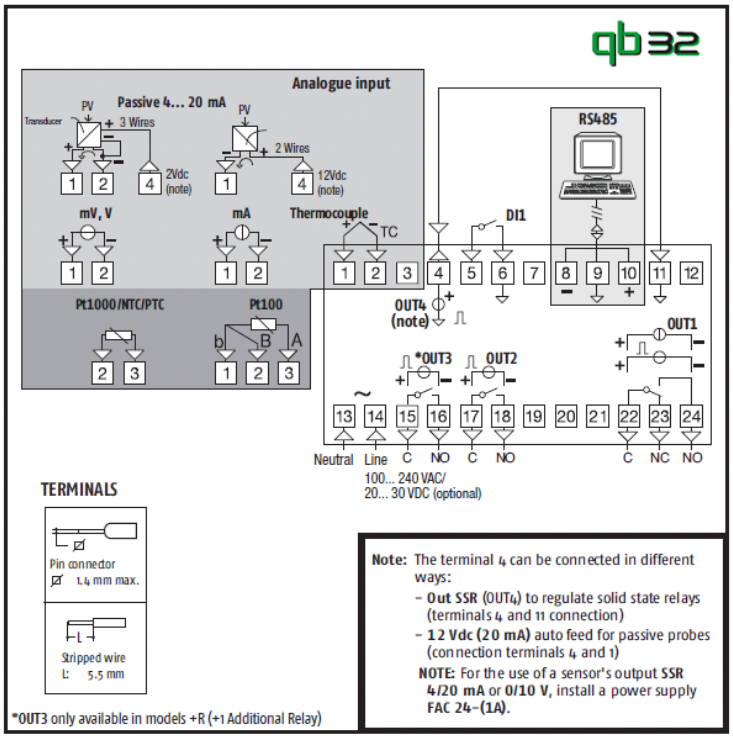
3.3 – ELECTRICAL CONNECTIONS

Perform the wiring connecting only one wire to each terminal and following diagram, controlling that the tension of supply is adapted for the equipment and that the load of the actuadores joined the equipment should not be superior to the allowed current.
The equipment is prepared to be permanently connected within a panel is not equipped with either switches or internal overvoltage protection devices.
It is recommended to install a switch / isolator bipolar type as the disconnect device, which interrupts the power supply of the equipment.
This switch should be placed as near as possible to the team and in a readily accessible location by the user.
In addition one recommends to protect adequately all the connected circuits to the equipment with devices (ex. fuses) proportionate to the effective current circuits.
Use cables with proper insulation adapted to the voltage, temperature and environmental conditions, and make the sensor wires from the entrance to keep away from power cords and other power cables to avoid induction of electromagnetic interference.

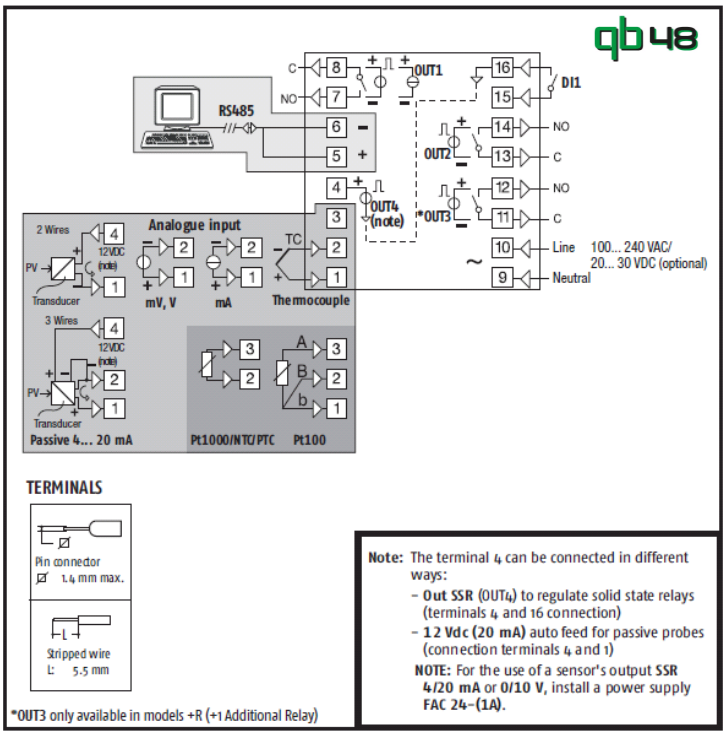
If some cables used for the wired up one are protected, one recommends to connect them to land for an alone side.
Finally check that the programmed parameters are those wished and that the application works correctly before connecting the outputs to the actuadores to avoid anomalies in the installation that hurts could cause to persons, things or animals.
OSAKA and his legal representatives are not done in any way responsible by eventual hurts to persons, things or animals as consequence of manipulations, improper use, mistaken employment or in any case without going in conformity with the characteristics of the equipment.

3.4 – SCHEME OF WIRING

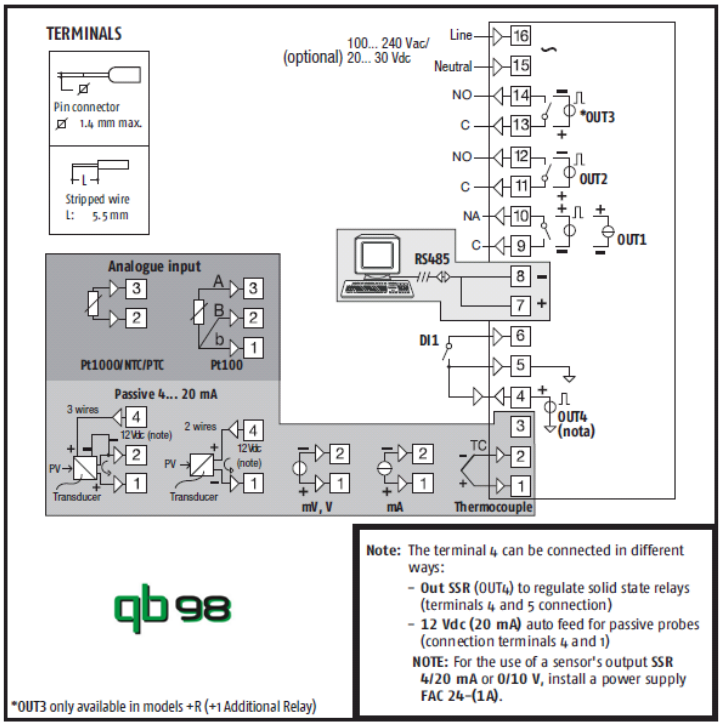
ELECTRICAL CONNECTIONS - QB 32



ELECTRICAL CONNECTIONS - QB 48


qb48
RS485
OUT1
OUT2
OUT4 (note)
*OUT3
DI1
Analogue input
2 Wires
3 Wires
12VDC (note)
Transducer
mV, V
mA
Thermocouple
Passive 4... 20 mA
Pt1000/NTC/PTC
Pt100
Line
Neutral
100... 240 VAC/ 20... 30 VDC (optional)
TERMINALS
Pin connector ⌀ 1.4 mm max.
Stripped wire L: 5.5 mm
*OUT3 only available in models +R (+1 Additional Relay)
Note: The terminal 4 can be connected in different ways:
- Out SSR (OUT4) to regulate solid state relays (terminals 4 and 16 connection)
- 12 Vdc (20 mA) auto feed for passive probes (connection terminals 4 and 1)
NOTE: For the use of a sensor's output SSR 4/20 mA or 0/10 V, install a power supply FAC 24-(1A).

ELECTRICAL CONNECTIONS - QB 98



4 - FUNCTIONING

4.1 – MEASURE AND VISUALIZATION

All parameters relating to the measure are contained in the folder **"InP"**.
By means of parameter **"SEnS"** it is possible to select the type of probe of input that is needed:
- for termopares J (J), K (CrAL), S (S), B (b), C (C), E (E), N (n), R (r), T (t), or for sensors of infrarojo OSAKA series IRS range with linearización IRS J (Ir. J) or IRS K (Ir.cA)
- for termoresistencia Pt100 IEC (rtd) or thermistor PT1000 [Rtd, Ptc or Ntc] from calibration of agreement to IN 60751/A2
- for sign normalized of current 0…20mA (0.20) or 4...20 mA (4.20)
- for signs normalized of tension 0...60mV (0.60), 12…60mV (12.60), 0…1V (0.1), 0…5V (0.5), 1...5V (1.5), 0...10V (0.10) ó 2…10V (2.10).

By changing these parameters, one advises to extinguish and to ignite the equipment to obtain a correct measure.
For the equipments with input of probe of temperature (tc, rtd) it is possible to select, by means of the parameter **"Unit"** the unit of measure of temperature (°C, °F) and, by means of the parameter **"dP"** the resolution of wished measure (0=1 °; 1=0,1 °).
As for the equipments programmed with input of normalized analog signal, it is necessary first of all to programme the resolution wished in the parameter **"dP"** (0=1; 1=0,1; 2=0,01; 3=0,001) and in the parámetro **"SSC/FSC"** the value that the equipment must visualize correspondent to the lower/superior limit sign of input (-1999 ÷ 9999).

<u>IMPORTANT NOTE:</u> Input NTC/PTC alone disponilbe in model QB 32-0.
The model QB 32-0 does not admit probes PT 100.

The new QB range allows doing a calibration of the mistakes of measure to 2 points of the process, making the set more precise between sensor + equipment and perfecting the process with the minimal possible mistake.
These parameters can be found in the folder **"CAL."**
The parameters that intervene are:

AL.P – Adjust Low Point
AL.o - Adjust Low Offset
AH.P – Adjust High Point
AH.o - Adjust High Offset

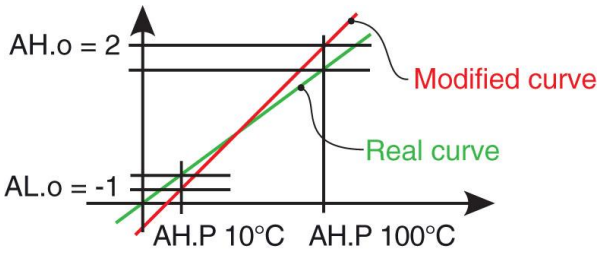
Later we explain a possible practical example of calibration:

Example: climatic Chamber with a working range of: 10 to 100°C.

1. Establish in the parameter AL.P = 10 and parameter AH.P = 100. These are the ranges of work of the supposed climatic chamber.

2. With the help of a calibrator, look at how much of detour is on the lower part of the process (in this case to 10 degrees) and to establish this difference in the parameter AL.o.
3. With the help of the gauge, to look how much at detour is in the top part of the process (in this case 100 degrees) and to establish this difference in the parameter AH.o.

Hereby, the process will remain corrected in all his curve, along the whole range.



By means of par. **"FiL"** can programme the constant of time of the " Filter software relative to the input" ó "Digital filter of input", so that it is possible to diminish the sensibility to the inconveniences of measure.
In case of mistake of measure, the equipment provides in output, the power programmed in the par. "OPE".
This power will be calculated based on the cycle time programmed by the regulator ID, whereas for the regulators ON/OFF it is considered automatically a time of cycle of 20 seg. (Eg in case of probe error with ON / OFF control and " OPE" = 50, the regulation output will be activated for 10 sec. , Then stays off for 10 sec. until the mistake of measure stays).

By means of par. **"InE"** it is possible to establish which are the conditions of mistake at the input that they lead the equipment to providing in output the power programmed in the couple "OPE".

The possibilities of par. **"InE"** are:
= Or: the condition occurs in case of over-range.
= Ur: the condition occurs in under-range.
+ = Our: the condition occurs in case of over-range or under-range.

Through of par. **"diSP"** present in the group **"PAn"** establishes the normal visualization of the display SV that can be the active Set Point (SPF), the power of regulation of output (Pou), the operative Set Point when there are active sections (Spo), the slogan of alarm AL1, 2 or 3 (AL1, AL2 or AL3).

4.2 – OUTPUT CONFIGURATION

The outputs of the equipment can be configured in the parameter folder **"Out",** where they are, depending on the type of outputs (digital or analog) various parameters.
- DIGITAL OUTPUT with relay or with SSR:
Par. **"O1F, o2F, o3F, o4F"**

These parameters can be programmed for the following functions:
NonE = Output not used
H.rEG = Heat output
c.rEG = Cold output
AL = Alarm output
t.out = Timer output
t.HoF = Timer output on Hold-OFF
P.End = end of program indicator
P.HLd = pause indicator program
P.uit = indicator program phase maintenance
P.run = indicator RUN program
P.Et 1/2 = Program Event 1/2
Or.bo = out of range or power failure indicator output
P.FAL = power failure indicator
bo.PF = Out of range indicator, power failure and power failure
St.bY = indicator Stand-by
dif. 1/2 = The output repeats the condition digital input 1/2
On= output 1 always on

Note: The timer functions and ramp or program is only available from the RAMP model.

In the parameter io4.F is selected the function that required for the output or input 4. This output function shared with digital input 2. So if wish use output 4 as a digital input extra or feeder probe, this output will be lost. Let's see how we can configure it.

on= Output 4 always ON (used as a power source of power);
out4 = output SSR
dG2.c = Digital input 2 for contact closure;
dG2.U = Digital input 2 driven by 12 ... 24 VDC.

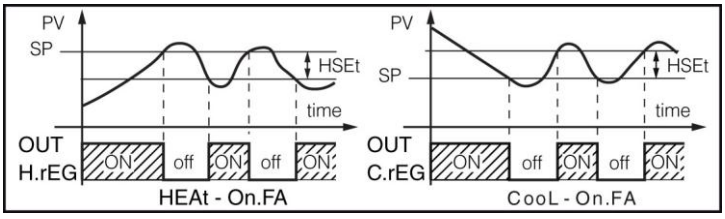
- ANALOG OUTPUT 0/4...20 mA o 0/2...10 V (o1t) (Only RMA models, OUT1 is the ANALOG OUTPUT):
Par. **"o1F":**
These parameters can be programmed for the following functions:
NonE = Output not used
H.rEG = Heating output
c.rEG = Cooling output
r.inP = Measure retransmission
r.Err = Error (sp - PV) retransmission
r.SP = Set point retransmission
r.SEr = Serial value of the RS485

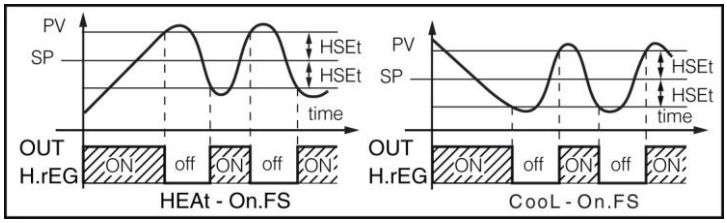
Across the parameter "o1t" is possible to choose the type of analogical output that is wished to choosing between:
0-20 = 0...20 mA
4-20 = 4...20 mA
0-10 = 0...10 V
2-10 = 2...10 V

In the parameters Ao1L and Ao1H are programmed the limits lower and Superior of the analogical output in case he needs. Only it will appear when the output is configurated like r. IMP, r. Err, r. SP or r.SEr.

4.3 - REGULATION ON/OFF (C.rEG)

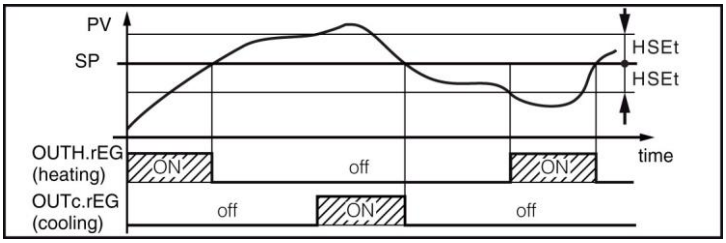
All parameters related to the regulation "ON / OFF" are contained in the **"rEG"** folder.
This mode of regulation is possible programming the parameter **"Cont"** = On.FS or = On.FA and it acts on the output configurated as **H.rEG or C.rEG** depending on the measure, of the Set point active **"SP"** and of the histéresis programmed **"HSEt".**
The team employs a regulation "ON / OFF" with symmetric hysteresis if "Cont" = On.FS or with asymmetrical hysteresis if "Cont" = On.Fa.
The regulator behaves of the following form: in case of inverse action, or of heat ("FunC" =HEAt), disables the output when the process value reaches the value [SP + HSEt] in case of symmetrical hysteresis, or [SP] in case of asymmetrical hysteresis and is activated when the value is below [SP - HSEt].
Vice versa, in case of direct action or cooling ("OXF" = c.rEG), disables the output when the process value reaches the value [SP - HSEt] in case of symmetrical hysteresis, or [SP] for asymmetric hysteresis reactivate when it is above the value [SP + HSEt].





4.4 - REGULATION ON/OFF WITH NEUTRAL ZONE (C.rEG/H.rEG)

All parameters related to the regulation "ON / OFF" Neutral Zone are in the **"]rEG"** folder.
The operation is feasible when 2 outputs are configured as H.rEG and C.rEG respectively.
The Dead Zone operation is used for the control of the facilities that possess an element that causes a positive increase (eg. Heater, humidifier, etc.) And an element which causes a negative increase (eg ad . Cooling , dehumidifying , etc.).
The control functions works on the configurated outputs depending on the measure of Set Point **"SP"** active, and hysteresis **"HSEt"** programmed.
The regulator behaves in the following way: Turn off the outputs when the process value reaches the Set and active output H.rEG when the process value goes below value [SP-HSEt] or lights the output C.rEG when process value is greater than [SP + HSEt].
For following, the element causing a positive increase has to be connected to the output programmed as H.rEG, while the element of negative growth, will go unit with the output configured as C.rEG.



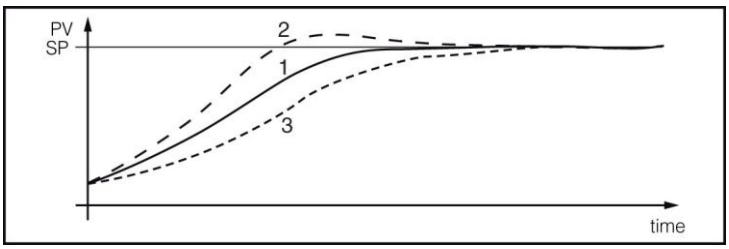
4.5 – REGULATION PID TO SINGLE ACTION

All parameters related to PID regulation are contained in the carpeta **"]rEG"** folder.
The mode PID regulation type action is feasible simply by programming the parameter **"Cont"** (contained in the **"]rEG"** folder) = Pid and works on the output of regulation in function to Set Point **"SP"** active, mode H.rEG operation or C.rEG, and the result of PID control algorithm with two degrees of freedom of the equipment.

Todos los parámetros relacionados a la regulación PID están contenidos en la carpeta **"]rEG".**
To achieve good stability of the variable in case of fast processes and actuator control with digital output, cycle time "tcc and tcH" should have a low value with a very frequent intervention of the regulation output.
In this case the use of a static relay (SSR) for the control actuator is recommended. (Use output 4 Programmed as SSR).
The algorithm of regulation PID of simple action of the equipment facilitates the programming of the following parameters:

"Pb" - Proportional Band
"ti" - Integral Time
"Td" - Derivative time
"tcH" - Time Output Cycle Heating
"tcc" - Time Out cliclo cooling
"rS" - Manual Reset (only if "ti = 0)
"FuOC" - Fuzzy Overshoot Control

The latter parameter eliminates the disturbances in the load (overshoot) of the start up of the process or of Set Point's change.
It should be noted that a low value of the parameter reduces the "overshoot" whereas a high value increases it.



1: Value "FuOC" OK
2: Value "FuOC" too high
3: Value "FuOC" too low

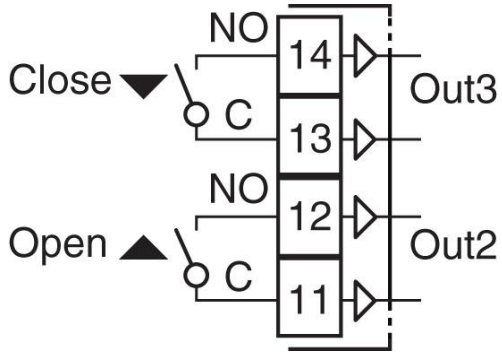
4.6 – REGULATIÓN PID TO DOUBLE ACTION (H.rEG + C.rEG)

All parameters related to PID control are contained in the **"]rEG"** folder.
The Double Action PID regulation is used to control of facilities where there is an element which causes a positive increase (eg. heat) and an element which causes a negative increase (eg. cooling) and acts when they are configurated 2 outputs as H. rEG and C.rEG and programming the par. **"Cont"** = Pid.
The element causing a positive increase will go connected to the output programmed as H.rEG while negative growth element will go connected to the output programmed as C.rEG.
The mode of regulation PID double action acts on both outputs C.rEG H.rEG and Set Point "SP" depending and the result of PID control algorithm with two degrees of freedom of the equipment.
To achieve good stability of the variable in case of fast processes and control actuators with digital outputs, cycle times "tcc" and "tch" should have a low value with a very frequent intervention of the regulation outputs.
In this case the uses of a static relay (SSR) to control actuators are recommended.
The PID control algorithm of double action equipment facilitates the programming of the following parameters:
"Pb" - Proportional Band
"ti" - Integral Time
"Td" - Derivative time
"tcH" - Time Output Cycle Heating
"tcc" - Time Out cliclo cooling
"rS" - Manual Reset (only if "ti = 0)
"FuOC" - Fuzzy Overshoot Control
"rcG" - Power Ratio or relation between power of the element in the output C.rEG and power of the element controlled for the output H.rEG

4.7 – REGULATIÓN PID FOR OPERATIONS MOTORIZED WITH TEMPORARY POSITIONING (H.rEG + C.rEG) (Only PLUS version available (3PT))

All parameters related to PID control for motorized actuators are contained in the **"]rEG"** folder.
This type of regulation is in use for the control of facilities provided with an operation motorized with controls of opening and closing of digital type that acts when configured 2 outputs respectively as H.rEG and c.rEG are, programming the par. **"Cont"** = 3 Pt
The control opening drive shall be provided with the output configured as H.rEG while closure controlling shall be provided with the output configured as C.rEG.
The mode PID regulation for motorized operation acts on the outputs H.rEG (heat or direct process) and C.rEG (cold or reverse process) based on the Set Point **"SP"** active and the result of PID control algorithm with two degrees of freedom of equipment.
The control system used does not provide feedback to set the current position of the drive.

If the actuator was not provided with safety contacts that interrupt the operation once run , it is necessary to provide the installation of these contacts (SQO, SQC) as shown in Figure



The PID regulation algorithm for motorized actuators with time positioning facilitates the setting of the following parameters:
"Pb" - Proportional Band
"ti" - Integral Time
"Td" - Derivative time
"rS" - Manual Reset (only if "ti = 0)
"FuOC" - Fuzzy Overshoot Control
"**Str.t":** carrer running time.
Is the time, expressed in seconds, which needs the drive to move to the position "normally open" to "closed".
"db.S": minimum value of regulation
It is the first value that must be reached regulation (in %) having effect on the output. Used to prevent the control from intervening frequently.

4.8 – FUNCTIONS OF AUTOTUNING AND SELFTUNING
All parameters related to the AUTOTUNING and SELFTUNING function are contained in the **"[4]rEG"** folder.
The AUTOTUNING's function and the SELTUNING they allow the automatic tuning of the regulator PID.
The **AUTOTUNING'**s function calculates the parameters PID across a cycle of tuning type SMART, which the parameters are memorized and during the regulation they are kept constant (in case of mistake ERAT put calculation **pid oscillatory or fast**, programming autotuning with a value auto = negative, [eg,-1,-2,-3,-4])

The **SELFTUNING** function (rule based in "TUNE-IN") motorizes regulation and the continuous calculation of the parameters during regulation.
Both functions automatically calculate the following functions:
"Pb" - Proportional Band
"tcc" - Time Out cliclo cooling
"tcH" - Time Output Cycle Heating
"ti" - Integral Time
"Td" - Derivative time
"FuOC" - Fuzzy Overshoot Control
And for the Double Action PID regulation also:
"rcG" - Relationship P C.rEG / P H.rEG

To activate the AUTO-TUNING function proceed as follows:
1) Program and activate the desired Set Point.
2) Program the parameter "Cont" = PID = 3 or Pt, if the equipment controls a motorized drive with time positioning.
3) If the control is of simple action, program the parameter "Func" according to the process to be controlled by the output.
4) Set 2 outputs as C.rEG H.rEG as if the equipment controls an installation with dual action or a motorized drive with time positioning.
5) Program the parameter **"Auto"** as:
Selection of autotuning:

-4 = Oscillating auto-tune with automaticrestart at power up and after all point change
-3 = Oscillating auto-tune with manual start
-2 = Oscillating -tune with auto-matic start at the first power up only
-1 = Oscillating auto-tune with auto-matic restart at every power up
0 = Not used
1 = Fast auto tuning with automatic restart at every power up
2 = Fast auto-tune with automatic start the first power up only
3 = FAST auto-tune with manual start
4 = FAST auto-tune with automatic restart at power up and after a set point change
5 = SMART-tune with automatic restart at every power up
6 = SMART-tune with automatic start the first power up only
7 = SMART-tune with manual start
8 = SMART-tune with automatic restart at power up and after a set point change

NOTE: the FAST autotuning type is particularly fast and does not show any effect, since he calculates the parameters of the controller during the phase of scope of the Set Point.
For proper implementation of the FAST autotuning type, it is necessary that in the beginning of cycle there is a certain difference regarding the process variable and the set point. For this reason the equipment starts the autotuning only when:
- The Fast autotining does not start when the Set Point is close to the initial reading.

- When the measured variable varies irregularly during the tuning cycle (for the motive due to the process the variable ascends or descends).
In this case we recommend using the autotuning of the oscillatory type, which acts in some cycles of ON-OFF control which leads the process value to oscillate around the value of set point completed and which happens to PID regulation with the parameter calculated autotuning.

6) Output programming parameters.
7) Connect the equipment to the control system.
8) Enable autotuning turning off and turning on the device if "Auto" = 4,5,1,2 or 2 or by selecting the **"tunE"** option.
At this point the auto-tuning function is activated and is signaled using the flashing LED TUNE.
The controller acts when the equipment's operations have ended and the parameters of PID control are the suitable.
If the conditions of the process values are not checked for autotuning, the display will show "erat ". This indicates that the equipment can not continue operations and the equipment will get in the normal mode of regulation and the parameters set above.
To clear the error "erat " is enough by pressing the Enter key.
In the event that is experienced an error of probe, the equipment will interrupt the running cycle.
The calculated value of autotuning will be automatically saved to your computer to complete the proper execution cycle in autotuning parameters relative to PID regulation.

Note: *The equipment come configured factory to perform auto-tuning on all versions of equipment ("Auto" = 7).*

To activate the SELF-TUNING function proceed as follows:
1) Establish and activate the desired Set Point.
2) Program the parameter "Cont" = Pid = 3Pt or if the equipment controls a motorized drive with time positioning.
3) If the control is a simple action set the parameter according to control process through the output.
4) Configure 2 outputs as C.rEG and H.rEG if the equipment controls a dual action installation or a motorized drive with time positioning.
5) Program the parameter "SELF" = yes
6) Exit from the parameter programming.
7) Connect the equipment to the controlled installation.

8) Activate self-tuning by selecting the "Tune" option in the main menu (or by correctly programming key "PISANI" conveniently scheduled).
When the Self-tuning function is not activated, the TUNE LED is permanently mode fixed, and all the PID parameters of regulation (“Pb "," ti”, " td”, ecc.) are not visualized any more.
To stop the Autotuning cycle or off Selftunting select the “SELF” menu any states regulation: "rEG","OPLO" or "OFF".
If the equipment shuts down during the auto-tuning or self-tuning function activated, the functions will be integrated into the take-off.

4.9 - SCOPE OF SET POINT WITH CONTROLLED SPEED AND AUTOMATIC COMMUTATION BETWEEN TWO SET POINT (RAMPS AND MANINTENANCE TIME)

All parameters related to the ramps functioning are contained in the **“]rEG”** folder.
You can achieve the set point is reached in a given time (in any case never greater than the time that the system needs naturally).
This can be useful in those processes (heating or chemical treatments, etc.) whose Set point must be reached gradually, in pre-established times.
Also you can get once reached the first Set (SP1) the equipment automatically switching to the second Set (SP2) after a programmable time, thus obtaining a simple automatic thermal cycle.
These functions are available for all types of programmable regulation.

The functioning is established by the following parameters:
- **"SP.u"** - Gradient of rise ramp (activated when the process value is lower than the set point), expressed in unit / minute.
- **"SPd"** - Gradient of descent ramp (activated when the process value is greater than the set point), expressed in unit / minute.
The functions are deactivated when will programming the relative parameters = InF.

4.10 - SOFT-START's FUNCTION, DELAYS AND PROTECTION
All parameters related to the operation of "Soft Start" and "Delay and Protections" are contained in the **“]rEG”** folder.
The Soft-Start function only works through PID control and allows to limit the power of regulation to boot the equipment for a set time.
This is useful when the actuator controlled by equipment could damage due to excessive power when this one is not still in conditions of regime (eg in the case of certain heating elements).

The functioning is determined by the following parameters:

- "St.P" - Power of Soft Start
- "Sst" - Soft Start Time (in hh.mm)
- "SS.tH" - Set of disable cycle Soft Start
Once set the parameter to the desired value when, to connect the equipment will proceed to provide output power programmed on par. "St.P" for the time set in par. "SSt" or to reach the absolute value set in par. "SS.tH".

In practice, the equipment operates in manual regulation automatically switching to regulation automatic to finish the time "SSt” or when the process value equals the value programmed on par. “HSEt “.
To disable the Soft Start function simply program par. "SSt” = OFF
The equipment allows doing a connection delay of the team using the "od" parameter. This parameter is expressed in hours.minutes (hh.mm)
If it is established a time in this parameter, once the equipment is ignited, until this time does not happen the exits of regulation will not be activated.

In case we work depending on cold, C.rEG, the equipment allows to put a protection for a compressor to avoid connections and desconexiones rapid in the compressor.
This is done across the parameter "cPdt" establishing a time in seconds.
In case that stop the compressor for temperature, until the time established in the parameter does "cPdt" not happen, always and when the temperature is not superior to the SP + HSET, the equipment will not return to start the compressor for protection.

4.11 – FUNCTIONING OF OUTPUT ALARM (AL1, AL2, AL3)

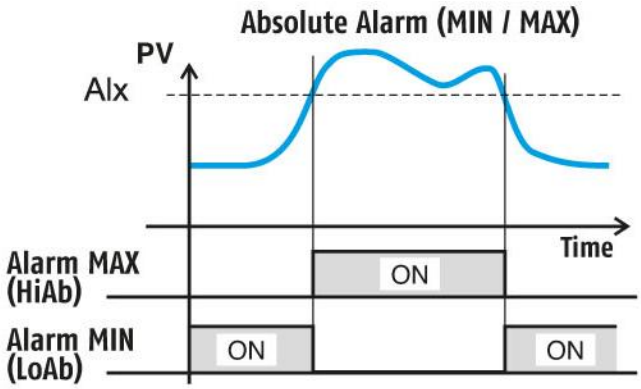
For the configuration the alarm functioning whose involvement is linked to the process value (AL1, AL2, AL3) is first necessary to establish to which output has to correspond the alarm.
To do this one needs configure the folder for all parameters "] Out" parameters relative to the outputs you want to use as alarms (" 1F", "O2F", "O3F", "O4F") programming the parameter relative to the desired output as **AL**.
Then we associate an alarm to the desired output through o1AL, o2AL, o3AL and o4AL parameters.

Note: *In all the following examples relate to AL1 alarm. Naturally the operation of the other alarms is the same,*
By accessing **“]AL1”** folders, the parameters relating to alarms are programmed:

"AL1t” - ALARM 1 TYPE
"Ab1" – ALARM 1 FUNCTION
“AL1” – AL1 THRESHOLD
“AL1L” – FOR HIGH AND LOW ALARMS, IT IS THE LOW LIMIT OF THE AL1 THRESHOLD; FOR BAND ALARM, IT IS LOW ALARM THRESHOLD
“AL1H” – FOR HIGH AND LOW ALARMS, IT IS THE HIGH LIMIT OF THE AL1 THRESHOLD; FOR BAND ALARM, IT IS HIGH ALARM THRESHOLD
“HAL1” – AL1 HYSTERESIS
“AL1d” – AL1 DELAY (in sec.)
"AL1o" – ALARM 1 ENABLING DURING STAND-BY MODE AND OUT OF RANGE CONDITIONS

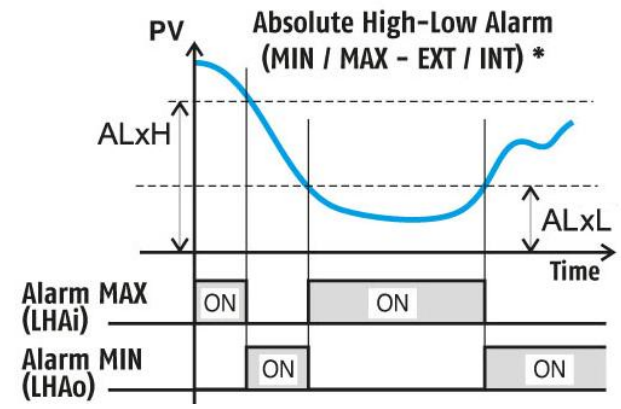
"AL1t" –ALARM 1 TYPE: You can have 10 different behaviors of the alarm outputs.
nonE = ALARM NOT USED.
LoAb = ABSOLUTE LOW ALARM:
The alarm is activated when the process value goes below the slogan the alarm set on the "AL1" parameter for deactivated when it rises above the setpoint [AL1 + HAL1].
With this mode is possible to program in par. "AL1L" and "AL1H" the limits that can be programmed for the slogan "AL1".

HiAb = ABSOLUTE HIGH ALARM:
The alarm is activated when the process value rises above the slogan the alarm in the parameter "AL1" to turn automatically itself off when it falls below the slogan [AL1 - HAL1]. In this mode you can set in par. "AL1L" and "AL1H" the limits within which you can program the slogan "AL1".

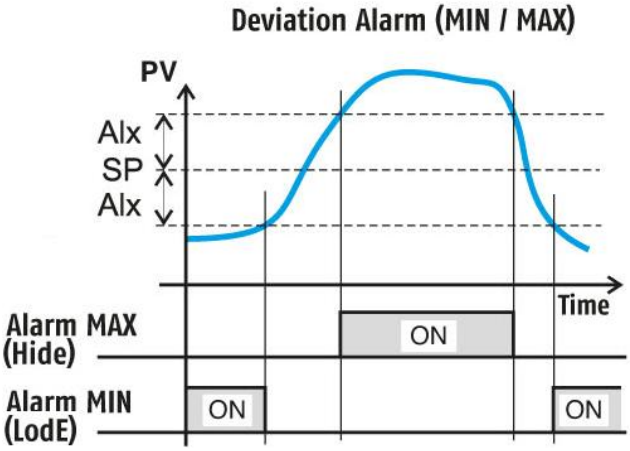


LHAo = The alarm acts when it exceeded the **High** Limit (ALH) or below the **Lower** (ALL). Will be disabled within the limits (ALH) and (ALL).

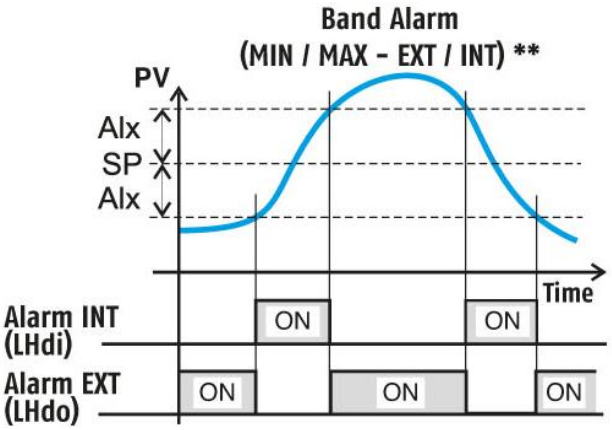
LHAI = The alarm is activated within the **Upper** Limit (ALH) and **Lower** (ALL). Will be disabled over the **Upper** Limit (ALH) and below the **Lower** (ALL).



SE.br = Sensor Break.
HidE = DEVIATION HIGH ALARM (RELATIVE): The alarm is activated when the process value goes above the value [SP + AL] for turn off automatically when it is below [SP + AL]. With this mode is possible to program in par. "AL1L" and "AL1H" and the limits within which it is possible to program the slogan "AL1".
LodE = DEVIATION LOW ALARM (RELATIVE): The alarm is activated when the process value goes below the value [SP - AL] to turn off automatically when is above of [SP - AL]. In this mode you can set the par. "AL1L" and "AL1H" the limits within which you can program the slogan "AL1".



LHdo = RELATIVE BAND ALARM IN ALARM OUT OF THE BAND (MAX / MIN): The alarm operates when exceeding the **High** Limit (SP + AL) or below the **Lower** (SP - AL) both relative to the Set Point. Will be disabled within the **High** Limit (SP + AL) and **Lower** (SP + AL) both relative to the Set Point.
LHdE = RELATIVE BAND ALARM IN ALARM INSIDE THE BAND (MAX / MIN): The alarm is activated within the **High** Limit (SP + AL) and **Lower** (SP - AL) both relative to the Set Point. Will be disabled over the **Upper** Limit (SP + AL) and below the **Lower** (SP - AL) both relative to the Set Point.

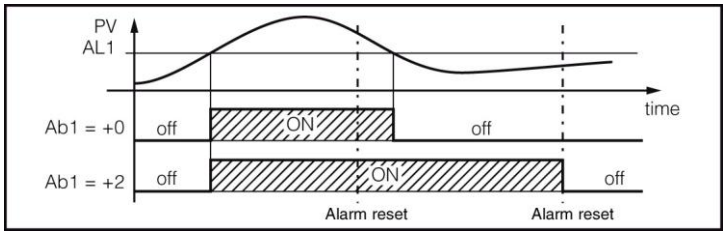


"**Ab1" – ALARM 1 FUNCTION:** The parameter can have a value between 0 and 15.
The programmed number that corresponds with the desired performance is obtained adding the values reported in the following description:

ALARM BEHAVIOUR TO THE CONNECTION: It can have 2 different behaviors of the alarm output, depending on the added value to par. "Ab1".
+0 = NORMAL BEHAVIOUR: The alarm is activated if and when alarm conditions exist.
+1 = ALARM NOT ACTIVATED AT THE CONNECTION: If the equipment is in alarm condition, this is not activated. The alarm is activated only when the process value after connection when alarm conditions exist.

ALARM DELAY: It can have 2 different behaviors of the alarm output, depending on the added value to par. "Ab1".
+0 = ALARM NOT DELAYED: The alarm is activated immediately after verifying alarm conditions.
+2 = ALARM DELAYED: On verify the alarms conditions the delay set in parameter are activated. "AL1d" (expressed in sec.) And only to pass the time the alarm will be activated.

MEMORY ALARM: It can have 2 different behaviors of the alarm output, depending on the value added to par. "Ab1".
+ 0 = ALARM NOT MEMORIZED: The alarm remains active in alarm conditions.
+ 4 = ALARM MEMORIZED: The alarm is activated when alarm conditions and remain active, but such conditions do not remain, but when is not press the key "PISANI" correctly programmed ("USrb" = Aac).



In the example the behavior is represented by a high absolute alarm.

STOP ALARM: It can have 2 different behaviors of the alarm output, depending on the value added to par. "Ab1".
+ 0 = ALARM NOT STOP: The alarm always remains active in alarm conditions.
+ 8 = ALARM STOP: The alarm is activated when there alarm conditions and can be disabled by the Key "PISANI" suitably programmed ("USrb" = ASi), although there are alarm conditions.

"AL1o" – ALARM 1 ENABLING DURING STAND-BY MODE AND OUT OF RANGE CONDITIONS: lets establish in that condition it should set the alarm when the equipment enters Standby mode or out of range:

0 = Alarm 1 disabled during Stand by and out of range
1 = Alarm 1 enabled in stand by mode
2 = Alarm 1 enabled in out of range condition
3 = Alarm 1 enabled in stand by mode and in overrange condition

4.12 – FUNCTION ALARMA OF LOOP BREAK
All parameters related to the functions relating to the alarm of "Loop Break" are contained in the **"LbA"** group.
The alarm "Loop Break" intervenes for reasons of short circuit of a thermocouple, thermocouple inversion, load interruption, etc., and the cycle regulation is interrupted.
For the configuration the output to the alarm which allocates "Loop Break", it is necessary to establish to which output should match the alarm.

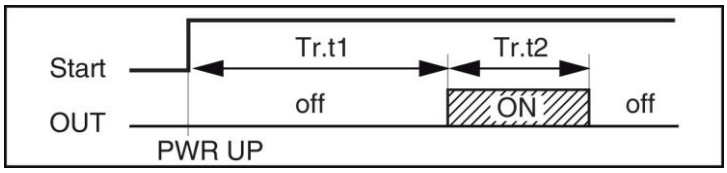
To do this, is necessary configure the parameters in the group **"]Out"** the relative parameter to the output you want to use ("O1F", "O2F", "O3F", "O4F") programming the parameter parameter to said output:
By accessing in **"]LbA"** folder, must be programmed in the **"O1AL"** parameter, over that associated to which output the alarm signal is intended.
The alarm "Loop Break" is activated if the output power (Parameter 54, "LbcA") remains at the value of 100 % for the time set in par. **"LbAt"** (expressed in sec.).
To not give rise to false alarms, the value set in this parameter should be executed taking into account the time of scope of the Set when the measured value is far from it (for example when starting the installation).
With the intervention of the alarm, the computer displays the message **"LbA"** and behaves as in the case of measure error, giving in power of output as programmed on par. **"OPE"** (programmable in **"]InP"** folder).
To restore normal operation after the alarm, choose the regulation mode "OFF" and reprogram the operation of automatic regulation ("rEG") after checking the correct operation of the probe and actuator.
To exclude the alarm "Loop Break" simply program "LbAt" = OFF.

4.13 FUNCTIONS OF TIMER (ONLY MODELS RAMPS)

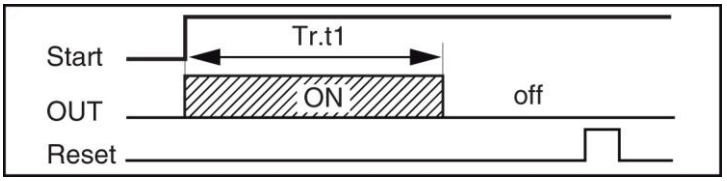
All parameters related to the timer-related functions are contained in the **"]TIN"** group.
We can schedule a output as timer programmed in the folder "]OUT" any of the outputs O1F, O2F, O3F, O4F = t.out

There are five types of timers available:
i.d.A: Delayed start with a delay time and a "end of cycle" time.

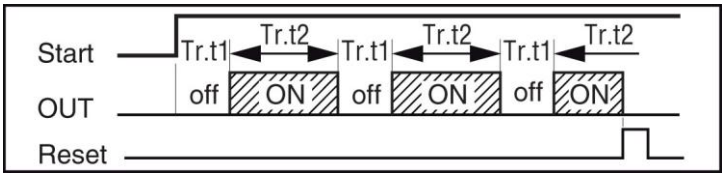
i.uP.d: Delayed start at power up with a delay time and a "end of cycle" time.



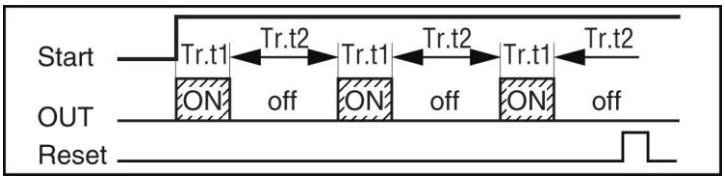
i.d.d: Start by the key pisani / digital input and time spent (Tr.t1) turn off output t.out = OFF.



i.P.L: Asymmetric timer for take-off by means of key pisani / digital input with beginning in OFF.



i.L.P: Asymmetric timer with take-off by means of key pisani / digital input with beginning in ON.



Notes:
1. The equipment can do the start, pause / stop and reset the timer by pressing the key, for analogue inputs and / or for the RS 485 input.

- In tr.u parameter: the time units are established:
  - **hh.nn** = Hours and minutes
  - **nn.SS** = Minutes and seconds
  - **SSS.d** = Seconds and tenth of a second

- In tr.t1 / tr.t2 parameters: time 1 and 2 are established.

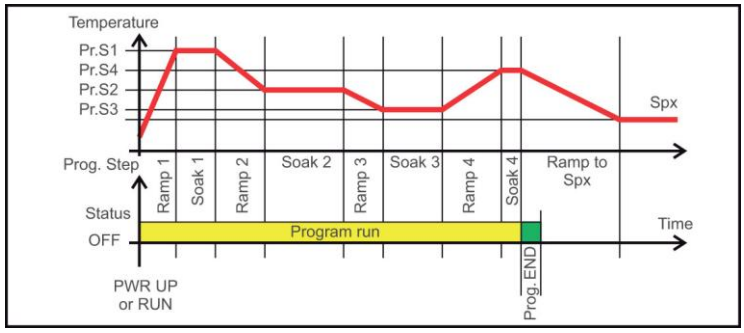
- (Parameter only as information) tr.St: state-timer:
  - **rES** = Reset timer
  - **run** = Run timer
  - **Hold**= Hold timer

4.14 FUNCTION OF RAMPS (ONLY MODELS RAMP)

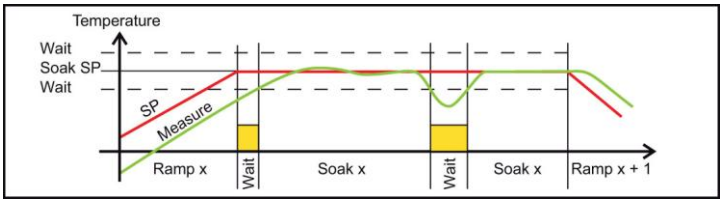
All parameters related to the relative roles of the ramps, are contained in the **"]PRG"** folder.

The QB range has a special version (Termination RAMP) which allows up do to 4 ramps 8 segments.
These ramps are controlled by Set Points (Pr.S1, Pr.S2, Pr.S3 and Pr.S4) and maintenance time Pr.t1, Pr.t2, Pr.t3 and Pr.t4.

The Set Points of temperature of every ramp can be controlled by means of degrees / minute doing the inclination of the ramp like you wish by means of the parameters Pr. G1, Pr. G2, Pr. G3 and Pr. G4.



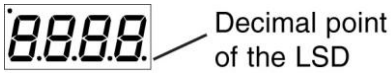
Once the ramps are executed, each time you reach a maintenance time, there are some security parámatros Pr.b1, Pr.b2, Pr.b3 and Pr.b4 that allow establish a differential safety that will assure that our maintenance process will remain, the time we've marked in Pr.t1, Pr.t2, Pr.t3 and Pr.t4.



It is necessary keep in mind that if the temperature of process value enters the "zone of safety", the account will begin at that time, so we recommend making a difference as low as possible according with the process to be performed.

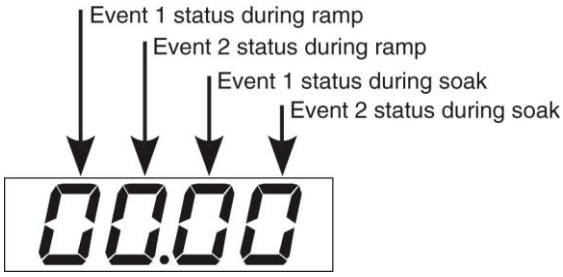
The parameters Pr.E1 / Pr.E2 / Pr.E3 / Pr.E4 are events of how the ramps are 1st, 2nd, 3rd or 4th.

The equipment can show the program status by a LED:



- Program in RUN - the LED is ON.
- Program in Hold - The LED is flashing fast
- Program in wait - The LED is flashing slow
- Program in end or reset - the LED is off

Where to according the state it will indicate us how he found the ramps:



Display	Ramp		Soak	
	Event 1	Event 2	Event 1	Event 2
0000	off	off	off	off
1000	on	off	off	off
0 100	off	on	off	off
1 100	on	on	off	off
00 10	off	off	on	off
10 10	on	off	on	off

Display	Ramp		Soak	
	Event 1	Event 2	Event 1	Event 2
0 110	off	on	on	off
1 110	on	on	on	off
000 1	off	off	off	on
100 1	on	off	off	on
0 10 1	off	on	off	on
1 10 1	on	on	off	on
00 11	off	off	on	on
10 11	on	off	on	on
0 111	off	on	on	on
1 111	on	on	on	on

- Pr.St: Program status;
  - rES= Reset program
  - run= RUN program
  - HoLd= Hold program

The additional informations are related to how the instrument is programmed; hence in many cases, only part of this information is available.

1. When the instrument is showing the “standard display” push button “▲”.

2. Push button again “▲”. When the programmer is running the lower display will show the segment currently performed and the Event status as shown below:

where the first character can be “r” for a ramp or “S” for a soak, the next digit show the number of the segment (e.g. S3 means Soak number 3) and the two less significant digits (LSD) show you the status of the two event (the LSD is the Event 2).

3. Push button ▲ again. When the programmer is running the lower display will show the theoretical remaining time to the end of the program preceded by a “P” letter:

4. Push button ▲ again. When the wattmeter function is running the lower display will show “U” followed by the measured energy.

5. Push button ▲ again. When the “Worked time count” is running the lower display will show “d” for days or “h” for hours followed by the measured time.

6. Push button ▲ again. The instrument returns to the “standard display”.

Note: The additional information visualization is subject to a time out. If no button is pressed for more than 10 second the instrument comes automatically back to the Standard display.

4.15 – FUNCTIONING OF THE KEY PISANI AND MANAGEMENT DISPLAY

The function of "PISANI" key can be defined by the **"USrb"** parameter in the “**PAn**” group.
The parameter can be programmed as:

- Parameters [121] uSrb – “↩” button function during RUN TIME:
  - **nonE=** The function key does nothing
  - **tunE =** Auto-tune/self-tune enabling. A single press (longer than 1sec) starts the auto-tune.
  - **oPLo =** Manual mode. The first pressure puts the instrument in manual mode (OPLO) while a second one puts the instrument in Auto mode (rEG), and vice versa.
  - **AAc =** Alarm reset. Pushing the key for 1 sec. is reset a alarm memorized (see par. 4.11)
  - **ASi =** Alarm acknowledge. Pushing the key for 1 sec. can stop an active alarm (see par. 4.11)
  - **chSP =** Sequential set point selection. Pushing the key for 1 sec. is selected one of the 4 Set Point memorized.
  - **St.by =** Stand by mode. The first press puts the instrument in stand by mode while a second one puts the instrument in Auto mode.
  - **Str.t =** Timer run/hold/reset.
  - **P.run =** Program run ramps.
  - **P.rES =** Program reset ramps.
  - **P.r.H.r =** Program run/hold/reset ramps.

- Parameter [122] **diSP** – Display management:

Their range values are:

  - **nonE**= Standard Display
  - **Pou**= Power output
  - **SPF**= Final set point
  - **Spo**= Operative set point
  - **AL1 / AL2 / AL**· = AL1 / AL2 / AL3 threshold.

- Parameter [123] **di.CL** – Display colour:

Their range values are:

0 = Automatic multicolor. The display colour is used to show the actual deviation (PV - SP);
1 = Display red (fix);
2 = Display green (fix);
3 = Display orange (fix).

- Parameter [124] **AdE** – Deviation for display colour management:
  Range values: 1 ÷ 999

- Parameter [125] **diS.t** – Display time out.
- Parameter [126] **FiLd** – Filter on the displayed value
  Range values: 0 ÷ 20

The parameters relative to consumption, for his viewing and configuration, we must go to the folder settings "**COn**":

- Parameter [133] Co.tY - Timer function:
  Its ranges values are from 0 (OFF) and 11. Where:
  OFF = Not used.
  1 = Instantaneous power (kW).
  2 = Power consumption (kW/h).
  3 = Counter synchronous program: it starts with the beginning of the program and stops at the end of the program. It gets to zero at program startup.
  4 = Total working time in days.
  5 = Total working time in hours.
  6 = Total working time on days with forced Stand-By reaching the inspection time (**h.Job**).
  7 = Total working time in hours with forced Stand-By reaching the inspection time (**h.Job**).
  8 = Total time in days in which the control output is activated.
  9 = Total time in hours in which the control output is activated.
  10 = Total time in days in which the control output is activated forced Stand-By reaching the inspection time (**h.Job**)
  11 = Total time in hours in which the control output is activated forced Stand-By reaching the inspection time (**h.Job**)

  Note: In case of regulation with linear output or servomotor only has meaning option **4**, **5**, **6**, **7**.
  Selection **4**-**11** represent an internal counter, that calculates the work hours and / or days of the device. Upon reaching the scheduled work time in the parameter [**136**] **h.Job** is generated "**r.iSP**" visualization (Requires Inspection) only configurations **6**, **7**, **10**, or **11**.
  The counter reset with subsequent cancellation of the request for inspection (**r.iSP**) can only be done by changing the value of the parameter [**136**] **h.Job**.
  For **Co.tY** = **6**, **7**, **10** or **11**, the counter reset causes the cancellation of the stand-by state and return to operational status.

- Parameter [134] UoLt – Nominal Voltage of the load:
  Range value: 1 ÷ 9999(V).

- Parameter [135] Cur – Nominal current of the load:
  Range value: 1 ÷ 999(A).
- Parameter [136] h.Job – Threshold of the working period:
  Their ranges values depend on the programmed value in parameter [133] Co.tY. These are:

  - OFF= Threshold not used
  - 0 ÷ 999 days when [133] Co.tY = 4, 6, 8, 10;
  - 0 ÷ 999 hours when [133] Co.tY = 5, 7, 9, 11;

- Parameter [136] t.Job – Worked time (not resettable)
  Range value: 1 ÷ 999(days) or 1 ÷ 999(hours).

4.16 – DIGITALS INPUTS

In case the output OUT 4 is not used, the equipment has a digital input whose operation is configurable through the "**diF1 / diF2"** parameter in the **"InP"** folder.
Parameters can be programmed as:

oFF = Not used,
1 = Alarm reset,
2 = Alarm acknowledge (ACK),
3 = Hold of the measured value, memory alarm,
4 = Stand by mode,
5 = Manual mode,
6 = HEAt with SP1 and CooL with SP2,
7 = Timer RUN/Hold/Reset,
8 = Timer Run,
9 = Timer Reset,
10 = Timer Run/Hold,
11 = Timer Run/Reset,
12 = Timer Run/Reset with lock,
13 = Program Start,
14 = Program Reset,
15 = Program Hold,
16 = Program Run/Hold,
17 = Program Run/Reset,
18 = Sequential SP selection,
19 = SP1 - SP2 selection,
20 = SP1... SP4 binary selection,
21 = Digital inputs in parallel to and keys and . (Only activating 2nd digital input).

In option 20 (binary selection "SP1÷SP4"), the combination of contacts associated with the closure of two digital inputs can activate one of the 4 Set Points memorized.

DIG IN1	DIG IN2	SET POINT
off	off	SP1
on	off	SP2
off	on	SP3
on	on	SP4

When the function is enabled, disable the active set point selection by "A.SP" parameter by "PISANI" key.

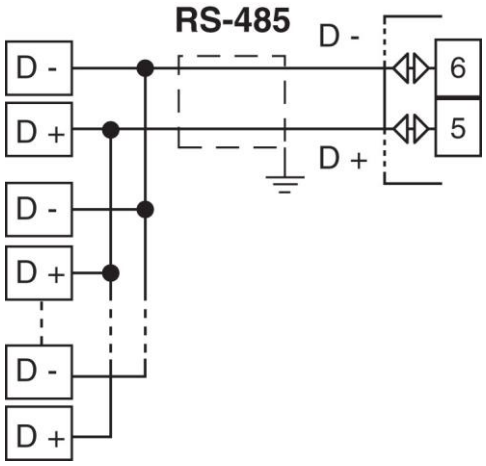
4.17 – INTERFACE SERIAL RS 485

The equipment can be provided with a serial communication interface RS 485 which is connected to a network in which are inserted another type of equipments (regulators or PLC) and a personal computer used as installation supervisor.
By means the PC you can acquired all functioning data, and program all parameters settings of the equipment.

The software protocol adopted at the QB range is a MODBUS-RTU type used in several PLC and supervision programs available on the market (the protocol manual of communication equipment QB series is available).
To keep the line under resting conditions is requested the link of a resistance (Rt) at end of value line 120 Ohm.
The equipment is equipped with two terminals called A and B that must be connected to all the namesake terminals of the network.
For wiring of the line is sufficient a double cable and telephone type interleaving and of connection ground all GND terminals.
If your equipment is equipped with a serial interface, program the following parameters available in the **"SEr"** group:

"Add": Instrument address. Programming a different number for each station 1 to 254
"baud": Transmission speed (baud-rate), programmable from 1200 to 38400 baud. All stations must have the same baud rate.
"trSP": Select the value for be relayed (Master). Its different programmations are:

- **nonE =** Retransmission not used (the equipment is a slave)
- **rSP =** The equiment it becomes Master and retransmits the active Set Point
- **PErc =** The equiment it becomes Master and retransmits the output power.

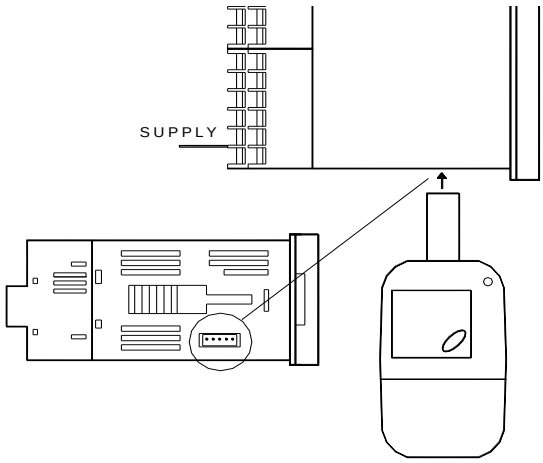


When it tries to enter in programming keyboard while is in progress a communication via serial, the equipment visualizes **"buSy"** indicating the busy status.

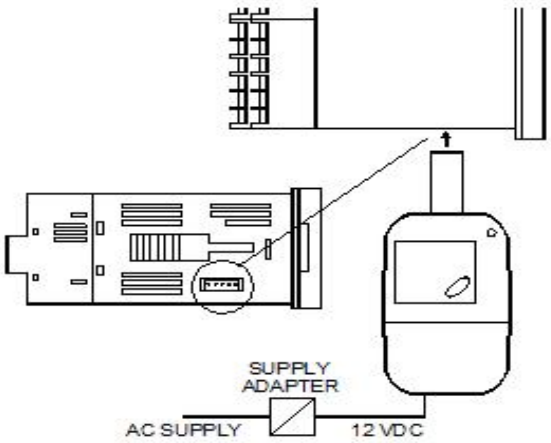
4.18 – CONFIGURATION OF PARAMETERS WITH KEY USB

The equipment is equipped with a connector that allows the transfer of the operating parameters to another computer using the device **USB KEY** of **5-pin** connection.
This device is used for serial programming of the equipments that must have the same configuration parameters or to keep a copy of the programming equipment and it can be transferred quickly.
To use the device USB KEY can be done only by feeding the device or the equipment:

Powered equipment and not powered KEY USB



Powered equipment by KEY USB



N.B.: *For equipment that are equipped with RS485 communication port is essential that with the parameter "trsp" is programed as = NONE. For more information and an indication of the cause of the error, view user manual in KEY USB device.*

5 – PROGRAMMABLE PARAMETERS TABLE

Then are described all the parameters that the team can adopt, some of them may not be present or because they depend on the type of equipment used or because they are automatically disabled as unnecessary parameters.

Group "] InP" (Parameters relative to the input)

Par.		Description	Range	Def.
1	**SEnS**	Type probe input: J = J thermocouple CrAL = K thermocouple S = thermocouple S b = thermocouple B E = thermocouple E n = thermocouple N r = thermocouple R t = thermocouple T C = thermocouple C J = TC J crAL = TC K S = TC S r = TC R t = TC T Ir.J = sens. IRS J Ir.cA = sens. IRS K Pt1 = Pt100 Pt10 = Pt1000 0.60 = 0...60 mV 12.60 = 12...60 mV Ptc = PTC **(QB 32-0 model only)** ntc = NTC **(QB 32-0 model only)** 0.20= 0...20 mA 4.20= 4...20 mA 0.1= 0…1 V 0.5=0…5 V 1.5= 1…5 V 0.10= 0…10 V 2.10= 2…10 V	tc : J/ CrAL/ S/ b/ E/ L/ n/ r/ t/ C/ Ir.J / Ir.CA rtd : Pt1 / Ptc / ntc I : 0.20 / 4.20 UoLt : 0.60 / 12.60 / 0.5 / 1.5 / 0.10 / 2.10	J
2	**dP**	Decimal Point input: Linear= 0 ÷ 3 Not linear= 0/1	0 ÷ 3 / (0/1)	0
3	**SSC**	Initial scale read-out for linear inputs V / I	-1999 ÷ 9999	0
4	**FSC**	Full Scale Readout for linear inputs V / I	-1999 ÷ 9999	1000
5	**Unit**	Engineer unit.	°C / °F	°C
6	**FiL**	Digital filter on the measured value.	0(=0FF)÷ 20.0 sec.	1.0
7	**InE**	Sensor error used to enable the safety output value 1- or = Over range 2- ou = Under range 3- our = Over and under range	3 / 1 / 2	OUr
8	**OPE**	Safety output value (% of the output)	-100 ÷ 100 %	0

9	**IO4.F**	I/O 4 function On = Output used as feed used as analog sensors. out4 = Output 4 SSR (digital output 4), dG2c = Digital input 2 driven by contact, dG2U = Digital input 2 driven by voltage	On / Out4 / dG2c / dG2U	Out4
10	**diF1**	Digital Input 1 function: oFF = Not used, 1 = Alarm reset, 2 = Alarm acknowledge (ACK), 3 = Hold of the measured value, memory alarm 4 = Stand by mode, 5 = Manual mode, 6 = HEAt with SP1 and CooL with SP2, 7 = Timer RUN/Hold/Reset, 8 = Timer Run, 9 = Timer Reset, 10 = Timer Run/Hold, 11 = Timer Run/Reset, 12 = Timer Run/Reset with lock, 13 = Program Start, 14 = Program Reset, 15 = Program Hold, 16 = Program Run/Hold, 17 = Program Run/Reset, 18 = Sequential SP selection, 19 = SP1 - SP2 selection, 20 = "SP1 ÷ SP4" binary selection, 21= Digital inputs in parallel to ⏶ and ⏷ **(Only activating 2nd digital input).**	oFF / 1 ÷ 21	oFF
11	**diF2**	Digital Input 2 function: Same functioning that "diF1". **(Only available with I0.4. F = dG2c)**	oFF / 1 ÷ 21	oFF
12	**di.A**	Action digital inputs (**Digital input 2 ONLY available if I0.4.F = dG2c**)	0 = DI1 direct action, DI2 direct action 1 = DI1 reverse action, DI2 direct action 2 = DI1 direct action, DI2 reverse action 3 = DI1 reverse action, DI2 reverse action	0

Group "] Out" (parameters relatives of the outpus)

Par.		Description	Range	Def.
13	**o1t**	Analogic Output 1 type **(Only available in QB 32 / 48 / 98 – RMA.)**	0 ÷ 20 mA 4 ÷ 20 mA 0 ÷ 10 V 2 ÷ 10 V	0 ÷ 20
14	**o1F**	Out 1 function type: ▪ **Analogical (Only version QB 32 / 48 / 98 – RMA):** NonE = Output not used H.rEG = Heating output c.rEG = Cooling output	NonE / H.rEG / c.rEG / r.inP / r.Err / r.SP / r.SEr / AL / t.out / t.HoF / p.End / P.HLd / P.uit / P.run / P.Et1-	H.rEG
		r.inP = Measure retransmission r.Err = Error (sp - PV) retransmission r.SP = Set point retransmission r.SEr = Serial value retransmission ▪ **Digital:** NonE = Output not used H.rEG = Heating output c.rEG = Cooling output AL = Alarm output t.out = Timer output t.HoF = Timer out -OFF in hold P.End = Program end indicator P.HLd = Program hold indicator P.uit = Program wait indicator P.run = Program run indicator P.Et1 = Program Event 1 P.Et2 = Program Event 2 or.bo = Out-of-range or burn out indicator P.FAL = Power failure indicator bo.PF = Out-of-range, burn out and Power failure indicator St.bY = Stand by status indicator diF.1 = The output repeats the digital input 1 status diF.2 = The output repeats the digital input 2 status on = Out 1 always ON	P.ET2 / Or.bo / P.FAL / bo.PF / St.bY / dif.1-dif.2 / On	
15	**Ao1L**	Initial scale value of the analog retransmission output (Only version QB 32 / 48 / 98 – RMA).	-1999 ÷ Ao1H	-1999
16	**Ao1H**	Full scale value of the analog retransmission (Only version QB 32 / 48 / 98 – RMA).	Ao1L ÷ 9999	9999
17	**o1AL**	Alarms linked up with the out 1.	0 ÷ 63 +1 = Alarm 1 +2 = Alarm 2 +4 = Alarm 3 +8 = Loop break alarm +16 = Sensor Break +32 = Overload on output 4	1
18	**o1Ac**	Out 1 action.	dir = Direct action rEU = Reverse action dir.r = Direct with reversed LED ReU.r = Reverse with reversed LED	dir
19 22 25	**O2F / O3F / O4F**	Out 2, 3 , 4 function: Same functioning that "0F1". **(Except analog output, available only in "01F")**	Same functioning that "0F1"	AL

20 23 26	**o2AL** **/ o3AL** **/ o4AL**	Alarms linked up with the out 2, 3, and 4.	Same functioning that "o1AL"	AL1 / AL2 /AL1+AL2
21 24 27	**o2Ac** **o3Ac** **o4Ac**	Out 2, 3 and 4 action.	Same functioning that “o1Ac”	dir

Group “] AL1 / AL2 / AL3” (parameters relatives to Alarms AL1 / AL2 / AL3)

Par.		Description	Range	Def.
28 36 44	**AL1t** **/ AL2t** **/ AL3t**	Alarm type AL1 / AL2 / AL3: nonE = Alarm not used LoAb = Absolute low alarm HiAb = Absolute high alarm LHAo = Windows alarm in alarm outside the windows LHAI = Windows alarm in alarm inside the windows SE.br = Sensor Break LodE = Deviation low alarm (relative) HidE = Deviation high alarm (relative) LHdo = Relative band alarm in alarm out of the band LHdi = Relative band alarm in alarm inside the band	nonE / LoAb / HiAb / LHAo / LHAI / SE.br / LodE / HidE / Lhdo / LHdi	HiAb / Loab / nonE
29 37 45	**Ab1** **/ Ab2** **/ Ab3**	Alarm function AL1 / AL2 / AL3: +1 = Not active at power up +2 = memorized +4 = silenced +8 = Relative alarm not active at set point change	0 ÷ 15	0
30 38 46	**AL1L** **/ AL2L** **/ AL3L**	Lower límit alarm AL1 / AL2 / AL3:	-1999 ÷ AL1H	-1999
31 39 47	**AL1H** **/ AL2H** **/ AL3H**	High límit alarm AL1 / AL2 / AL3.	AL1L ÷ 9999	9999
32 40 48	**AL1** **/ AL2** **/ AL3**	AL1 / AL2 / AL3 threshold.	AL1L÷ AL1H	0
33 41 49	**HAL1** **/ HAL2** **/ HAL3**	AL1 / AL2 / AL3 hysteresis.	1÷ 9999	1
34 42 50	**AL1d** **/ AL2d** **/ AL3d**	AL1 / AL2 / AL3 delay.	OFF ÷ 9999 sec.	OFF
35 43 51	**AL1o** **/ AL2o** **/ AL3o**	Alarm 1 / 2 / 3 enabling during Stand-by mode and out of range conditions 0 = Alarm disabled during Stand by and out of range 1 = Alarm enabled in stand by mode 2 = Alarm enabled in out of range condition 3 = Alarm enabled in stand by mode and in overrange condition	0 / 1 / 2 / 3	0

Group “] LBA” (parameters relatives to Loop Break Alarm)

Par.		Description	Range	Def.
52	**LbAt**	LBA time	OFF ÷ 9999 sec.	OFF
53	**LbSt**	Delta measure used by LBA during Soft start	0 ÷ 9999	10
54	**LbAS**	Delta measure used by LBA	1 ÷ 9999	20
55	**LbcA**	Condition for LBA enabling: uP = Active when Pout = 100% dn = Active when Pout = -100% both = Active in both cases	uP / dn / both	both

Group “] rEG” (parameters relatives to control)

Par.		Description	Range	Def.
56	**Cont**	Control type: Pid = PID On.FA = ON/OFF asymmetric hysteresis On.FS = ON/OFF symmetric hysteresis nr = Heat/Cool ON/OFF control with neutral zone 3Pt = Servomotor control (Only available in models QB 32 / 48 / 98 – PLUS(3PT)	Pid / On.FA On.FS / nr 3Pt	Pid
57	**Auto**	Autotuning selection: -4 = Oscillating auto-tune with automaticrestart at power up and after all point change -3 = Oscillating auto-tune with manual start -2 = Oscillating -tune with auto-matic start at the first power up only -1 = Oscillating auto-tune with auto-matic restart at every power up 0 = Not used 1 = Fast auto tuning with automatic restart at every power up 2 = Fast auto-tune with automatic start the first power up only 3 = FAST auto-tune with manual start 4 = FAST auto-tune with automatic restart at power up and after a set point change 5 = Evo-tune with automatic restart at every power up 6 = Evo-tune with automatic start the first power up only 7 = Evo-tune with manual start 8 = Evo-tune with automatic restart at power up and after a set point change	-4 / -3 / -2 / -1 / 0 / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	7
58	**Aut.r**	Manual start of the Autotuning OFF= Not active On= Active	OFF / On	OFF

59	**SELF**	Self tuning enabling	no / yES	no
60	**HSEt**	Hysteresis of the ON/OFF control	1 ÷ 9999	1
61	**cPdt**	Time for compressor protection	0 ÷ 9999 Sec.	OFF
62	**Pb**	Proportional band	1 ÷ 9999	50
63	**ti**	Integral time	0 ÷ 9999 Sec.	200
64	**td**	Derivative time	0 ÷ 9999 Sec.	50
65	**FuOc**	Fuzzy overshoot control	0.00 ÷ 2.00	0.5
66	**tcH**	Heating output cycle time	0.1 ÷ 130.0 Sec.	20.0
67	**rcG**	Power ratio between heating and cooling action	0.01 ÷ 99.99	1.00
68	**tcc**	Cooling output cycle time	0.1 ÷ 130.0 Sec.	20.0
69	**rS**	Manual reset	-100.0 ÷ 100.0 %	0.0
70	**Str.t**	Servomotor stroke time	5 ÷ 1000 Sec.	60
71	**db.S**	Servomotor dead band	0 ÷ 100 %	50
72	**od**	Delay at power up	OFF ÷ 99.59 (hh.mm)	OFF
73	**St.P**	Maximum power output used during soft start	-100 ÷ 100 %	0
74	**SSt**	Soft start time OFF= 0.00 hh.mm= 0.1 ÷ 7.59 On= inF	0.00 (=OFF) / 0.1 ÷ 7.59 / inF	OFF
75	**SS.tH**	Threshold for soft start disabling	-1999 ÷ 9999	9999

Group "] SP" (parameters relatives to Set Point)

Par.		Description	Range	Def.
76	**nSP**	Number of used set points	1 ÷ 4	1
77	**SPLL**	Minimum set point value	-1999 ÷ SPHL	-1999
78	**SPHL**	Maximum set point value	SPLL ÷ 9999	9999
79 80 81 82	**SP** **/ SP2** **/ SP3** **/ SP4**	Set Point 1, 2, 3 y 4	SPLL ÷ SPHL	0
83	**A.SP**	Selection of the active set point	1 ÷ nSP	1
84	**SP.rt**	Remote set point type: ***RSP*** **=** The value coming from serial link is used as remote set point ***trin*** **=** The value will be added to the local set point selected by A.SP and the sum becomes the operative set point ***PErc*** **=** The value will be scaled on the input range and this value will be used as remote SP	RSP / Trin / Perc	Trin
85	**SPLr**	Local/remote set point selection	Loc= local rEn= remote	Loc
86	**SP.u**	Rate of rise for **POSITIVE** set point change (ramp UP)	0.01 ÷ 99.99 (inF) Units for minuts	inF
87	**SP.d**	Rate of rise for **NEGATIVE** set point change (ramp DOWN))	0.01 ÷ 99.99 (inF) Units for minuts	inF

Group "] TIN" (Timer function parameters)

Par.		Description	Range	Def.
88	**tr.F**	Independent timer function: NonE = Timer not used i.d.A = Delayed start timer i.uP.d = Delayed start at power up i.d.d = Feed-through timer i.P.L = Asymmetrical oscillator with start OFF i.L.P = Asymmetrical oscillator with start ON	NonE / i.d.A / i.uP.d / i.d.d / i.P.L / i.L.P	NonE
89	**tr.u**	Timer unit: hh.nn = Hours and minutes nn.SS = Minutes and seconds SSS.d = Second and tenth of seconds	hh.nn / nn.SS / SSS.d	nn.SS
90 91	**tr.t1** **/ tr.t2**	Timer 1 / 2 = Tr.u= - hh.mm= 00.01...99.59 - mm.ss= 00.01...99.59 - sss.d= 000.1...995.9	hh.mm / mm.ss / sss.d	1.00
92	**tr.St**	Timer status: rES = Timer reset run = Timer run HoLd = Timer hold	rEs / run / Hold	rES

Group "] PRG" (Programmer function parameters)

Par.		Description	Range	Def.
93	**Pr.F**	Program action at power up: nonE = Programmer not used S.uP.d = Start at power up with a first step in stand-by S.uP.S = Start at power up u.diG = Start at Run command detection only u.dG.d = Start at Run command with a first step in stand-by	nonE / S.uP.d / S.uP.S / u.diG / u.dG.d	NonE
94	**Pr.u**	Engineering unit of the soaks: hh.nn = Hours and minutes nn.SS = Minutes and seconds	hh.nn / nn.SS	hh.nn
95	**Pr.E**	Instrument behaviour at the end of the program execution: cnt = continue A.SP = go to the set point selected by A.SP St.by = go to stand-by mode	Cnt / A.SP / St.by	A.SP
96	**Pr.Et**	Time of the end program indication	0.00 ÷ 99.59 (nn.SS)	OFF
97 102 107 112	**Pr.S1** **/ Pr.S2** **/ Pr.S3** **/ Pr.S4**	Set point soak 1st, 2nd, 3rd or 4th:	SPLL (=OFF) ÷ SPHL	0

98 103 108 113	**Pr.G1** **/Pr.G2** **/Pr.G3** **/Pr.G4**	Gradient of the ramp 1st, 2nd, 3rd or 4th:	0.1 ÷ 999.9	inF
99 104 109 114	**Pr.t1** **/ Pr.t2** **/ Pr.t3** **/ Pr.t4**	Time of the soak 1st, 2nd, 3rd or 4th:	0.00 ÷ 99.59	0.10
100 105 110 115	**Pr.b1** **/ Pr.b2** **/ Pr.b3** **/ Pr.b4**	Wait band of the soak 1st, 2nd, 3rd or 4th:	0 (=OFF) ÷ 9999	OFF
101 106 111 116	**Pr.E1** **/ Pr.E2** **/ Pr.E3** **/ Pr.E4**	Events of the 1st, 2nd, 3rd or 4th group:	00.00 ÷ 11.11	00.00
117	**Pr.St**	Program status: rES = Program reset run = Program start HoLd = Program hold	rES / run / HoLd	rEs

Group "] PAn" (Operator HMI parameters)

Par.		Description	Range	Def.
118	**PAS2**	Level 2 password (limited access level): - OFF= El nivel 2 no está protegido por una contraseña. - 1...200	OFF / 1…200	20
119	**PAS3**	Level 3 password (complete configuration level)	3 ÷ 200	30
120	**PAS4**	Level 4 password (CODE express configuration level)	201 ÷ 400	300
121	**USrb**	"↻"button function during RUN TIME: nonE = No function tunE = Auto-tune/self-tune enabling. A single press (longer than 1 second) starts the auto-tune oPLo = Manual mode. The first pressure puts the instrument in manual mode (OPLO) while a second one puts the instrument in Auto mode AAc = Alarm reset ASi = Alarm acknowledge chSP = Sequential set point selection St.by = Stand by mode. The first press puts the instrument in stand by mode while a second one puts the instrument in Auto mode. Str.t = Timer Run/hold/reset P.run = Program run P.rES = Program reset P.r.H.r = Program run/hold/reset	nonE / tunE / oPLo / Aac / Asi / chSP / St.by / Str.t / P.run / P.rEs / P.r.H.r	tunE
122	**diSP**	Display management: nonE = Standard display Pou = Power output SPF = Final set point Spo = Operative set point AL1 = Alarm 1 threshold AL2 = Alarm 2 threshold AL3 = Alarm 3 threshold	nonE / Pou / SPF / Spo / AL1 ÷ AL3 / Pr.tu / Pr.td / P.t.tu / P.t.td / ti.uP / ti.du / PErc	0

122	**diSP**	Ramp/Timer: Pr.tu= - During a soak, the instrument shows the soak elapsed time; - During a ramp the display shows the operative set point. At the end of the program execution, the instrument will show "P.End" messages alternately with the measured value. Pr.td= - During a soak, the instrument shows the soak remaining time (count down). - During a ramp the display shows the operative set point. At the end of the program execution, the instrument shows "P.End" messages alternately with the measured value. P.t.tu= When the programmer is running, the display shows the total elapsed time. At the end of the program execution, the instrument shows "t.End" messages alternately with the measured value. P.t.td= When the programmer is running, the display shows the total remaining time (count down). At the end of the program execution, the instrument shows "P.End" messages alternately with the measured value. ti.uP = When the timer is running, the display shows the timer counting up. At the end of the counting, the instrument shows "t.End" messages alternately with the measured value. ti.du= When the timer is running, the display shows the timer counting down. At the end of the counting, the instrument shows "t.End" messages alternately with the measured value. PErc= Percent of the power output used during soft start (when the soft start time is equal to infinite, the limit is ever active and it can be used also when ON/OFF control is selected)	nonE / Pou / SPF / Spo / AL1 ÷ AL3 / Pr.tu / Pr.td / P.t.tu / P.t.td / ti.uP / ti.du / PErc	0

123	**di.cL**	Display colour: 0= Automatic multicolor 1 = Display red (fix) 2 = Display green (fix) 3 = Display orange (fix)	0 / 1 / 2 / 3	0
124	**AdE**	Deviation for display colour management	1 ÷ 999	5
125	**di.St**	Display Timeout.	OFF / 0.1 ÷ 99.59 (mm.ss)	OFF
126	**fiLd**	Filter on the displayed Value.	OFF / OFF ÷ 20.0	OFF
127	**dSPu**	Instrument status at power ON: AS.Pr = Starts in the same way it was prior to the power down Auto = Starts in Auto mode oP.0 = Starts in manual mode with a power output equal to zero St.bY = Starts in stand-by mode	AS.Pr / Auto / oP.0 / St.bY	AS.Pr
128	**oPr.E**	Operative modes enabling: ALL = All modes will be selectable by the next parameter Au.oP = Auto and manual (OPLO) mode only will be selectable by the next parameter Au.Sb = Auto and Stand-by modes only will be selectable by the next parameter	ALL / Au.oP / Au.Sb /	ALL
129	**oPEr**	Operative mode selection: ▪ If oPr.E = ALL: - Auto = Auto mode - oPLo = Manual mode - St.bY = Stand by mode ▪ If oPr.E = Au.oP: - Auto= Auto mode - oPLo= Manual mode ▪ If oPr.E = Au.Sb: - auto= Auto mode - St.bY= Stand-by mode	oPr.E = ALL / oPr.E = Au.oP / oPr.E = Au.Sb	Auto

Group "] SEr" (Serial link parameters)

Par.		Description	Range	Def.
130	**Add**	Instrument address:	OFF / 1 ÷ 254	1
131	**Baud**	baud rate: 1200= 1200 baud 2400= 2400 baud 9600= 9600 baud 19.2= 19200 baud 38.4= 38400 baud	1200 / 2400 / 9600 / 19.2 / 38.4	9600
132	**trSP**	Selection of the value to be retransmitted (Master): nonE = Retransmission not used (the instrument is a slave) rSP = The instrument becomes a Master and retransmits the operative set point PErc = The instrument become a Master and it retransmits the power output	nonE / rSP / PErc	nonE

Group "] COn" (Consumption parameters)

Par.		Description	Range	Def.
133	**Co.tY**	Measurement type: oFF = Not used 1 = Instantaneous power (kW) 2 = Power consumption (kW/h) 3 = The energy used during the execution of the program. 4 = Total working time in days. 5 = Total working time in hours. 6 = Total working time on days with forced Stand-By at reaching the inspection time (h.Job). 7 = Total working time in hours with forced Stand-By at reaching the inspection time (h.Job). 8 = Total time in days which the control output is ON. 9 = Total time in hours which the control output is ON. 10 = Total time in days which the control output is activated and forced Stand-By at reaching the inspection time (h.Job). 11 = Total time in hours which the control output is activated and forced Stand-By at reaching the inspection time (h.Job)	OFF / 1 ÷ 11	OFF
134	**UoLt**	Nominal Voltage of the load	1 ÷ 9999 (V)	230
135	**Cur**	Nominal current of the load	1 ÷ 999 (A)	10
136	**h.Job**	Threshold of the working period: oFF = threshold not used 0... 9999 days (when [132] cotY = 4) 0... 9999 hours (when [132] cotY = 5)	OFF / 0 ÷ 999 days OFF / 0 ÷ 999 hours	0
137	**t.Job**	Worked time (not resettable)	0 ÷ 999 Days 0 ÷ 999 Hours	-

Group "] CAL" (User calibration parameters)

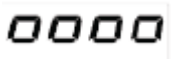
Par.		Description	Range	Def.
138	**AL.P**	Adjust Low Point	-1999 ÷ AH.P-10	0
139	**AL.o**	Adjust Low Offset	-300 ÷ 300	0
140	**AH.P**	Adjust High Point	AL.P+10 ÷ 9999	9999
141	**AH.o**	Adjust High Offset	-300 ÷ 300	0

6 - PROBLEMS, MAINTENANCE AND WARRANTY

6.1 – SIGNS OF ERROR:

Out of range signals
The upper display shows the OVER-RANGE and UNDERRANGE conditions with the following indications:

Over-range



Under-range

The sensor break will be signalled as an out of range:

Note: When an over-range or an under-range is detected, the alarms operate as in presence of the maximum or the minimum measurable value respectively.
To check the out of span Error condition, proceed as follows:

1. Check the input signal source and the connecting line.
2. Make sure that the input signal is in accordance with the instrument configuration. Otherwise, modify the input configuration.
3. If no error is detected, send the instrument to your supplier to be checked.

List of posible errors

Error	Reason	Action
ErAt	Autotuning unenforceable because it khan not verify the condition for starting it.	Press the ENTER key to clear the error. Repeat autotuning after checking the cause of the error.
OuLd	Overload or output short circuit 4 when used as an output or as transmitter power supply	Check output 4 for the short circuit disappears.
noAt	Auto-tune not finished within 12 hours.	Try to repeat the autotuning after controlling the operation of the probe and actuator.
ErEP	Possible problem in the memory EEPROM	Press the Enter key and if the problem persists, send the equipment to the supplier.
RonE	Possible problem in the memory FIRMWARE	Send the equipment to the supplier.
Errt	Possible problem of the calibration memory.	Send the equipment to the supplier
riSP	Request for Inspection activated by programming.	Contact who has programmed the device.

6.2 - MAINTENANCE

This instrument does not require periodical recalibration and it have no consumable parts so that no particular maintenance is required.

Some times, a cleaning action is suggestible.

1. SWITCH THE EQUIPMENT OFF (power supply, relay out, etc.).
2. Take the instrument out of its case.
3. Using a vacuum cleaner or a compressed air jet (max. 3 kg/cm2) remove all deposits of dust and dirt which may be present on the case and on the internal circuits being careful not to damage the electronic components.

4. To clean external plastic or rubber parts use only a cloth moistened with:
• Ethyl Alcohol (pure or denatured) [C2H5OH] or
• Isopropyl Alcohol (pure or denatured) [(CH3)2CHOH]
or
• Water (H2O).
5. Make sure that there are no loose terminals.
6. Before putting the instrument back in its case, make sure that it is perfectly dry.
7. Put the instrument back and turn it ON.

6.3 – WARRANTY AND REPAIR

This device has a guarantee in form of repair or replacement by manufacturing defects in materials of 12 months from the date of purchase.
OSAKA SOLUTIONS automatically void this guarantee and is not liable for any damages deriving from:

- Use, installation, or use and handling undue, others than those described above and, in particular, differs from the safety requirements established by the regulations.
- Use in applications, machines or electrical panels that do not provide adequate protection against liquids, dust, grease and electric shocks to the installation conditions made.
- The inexperienced handling, and / or alteration of the product.
- The installation / use in applications, machines or electrical panels do not comply with the valid norm.

In case of defective product under warranty or out of that period, it should contact the post sales service to perform the necessary steps. Request document repair "RMA" (by mail or fax) and complete it, is necessary send the RMA and the device to SAT OSAKA by method prepaid.

7 – TECHNICAL DATA

7.1 – ELECTRICAL CHARACTERISTICS

Power supply: 100... 240 VAC (-15... +10% of the nominal value);
Frequency AC: 50/60 Hz.
Consumption: 5 VA max.
Terminals protection: IP 20 according to EN 60070-1;
Terminal block: 16 M3 screw terminals for cables of 0.25... 2.5 mm2 (AWG22... AWG14) with connection diagram;
Panel cutout: 45 (+0.6) x 45 (+0.6) mm [1.78 (+0.023) x 1.78 (+0.023) in.]
Insulation voltage: 2300 V rms according to EN 61010-1;
Display updating time: 500 ms;
Sampling time: 130 ms;
Resolution: 30000 counts;
Total Accuracy: ±0.5% F.S.V. ±1 digit @ 25°C of room temperature;
Input/s: 1 input by temperature probe: tc J, K, S, B, C, E, L, N, R, T; infrared sensor OSAKA IRS J and K range; RTD Pt 100 IEC; PTC KTY 81-121 (990 Ω @ 25°C); NTC 103AT-2 (10KΩ @ 25°C) or signals in mV 0...50 mV, 0...60 mV, 12 ...60 mV or signal standard 0/4...20 mA, 0/1...5 V , 0/2...10 V;
1 input for current transformer (max. 50 mA)
2 Digital input for voltage free contacts.
Normalized impedance input signal: 0/4…20 mA: 51 Ω; mV y V: 1 MΩ

Output/s: Up to 6 digital outputs; with relay OUT1: SPST-NO (6 A-AC1, 3 A-AC3 / 250 VAC), OUT2, 3, 4, 5: SPST-NO (4 A-AC1, 2 A-AC3 / 250 VAC), or in piloting voltage SSR (12 VDC / 20 mA).
Up 2 analog output (OUT1, 2): 0/4...20 mA (Load Max. 300 Ω) o 0/2...10 V.
Auxiliar supply output/OUT6: 12 VDC / 20 mA Max.
Electrical life for relay outputs: 100000 operaz.
Installation category: II
Measurement category: I
Class of protection against electric shock: Front in Class II
Insulation: Reinforced between the low voltage section (supply and outputs with relay) and front panel; Reinforced between the low voltage section (supply and outputs with relay) between parts of very low voltage(inputs, static outputs, analog outputs), static outputs and analogic respect to the input, 50 V insulation between RS485 and parts low voltage.

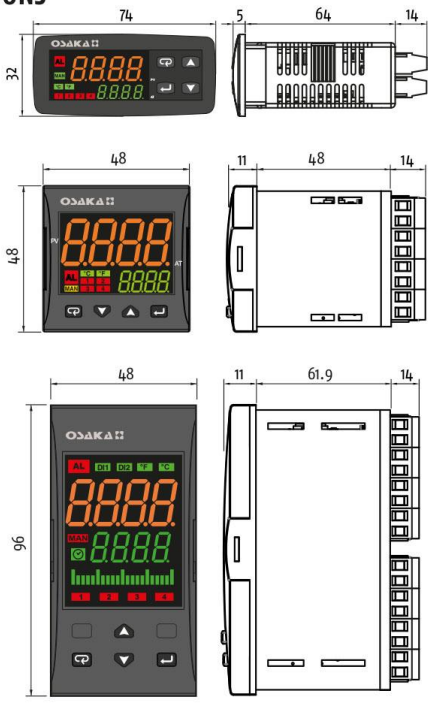
Electromagnetic compatibility and safety requirements:
Compliance: directive EMC 2004/108/CE (EN 61326-1), directive LV 2006/95/CE (EN 61010-1);
Pollution category: II;
Temperature drift: It is part of the global accuracy;
Operating temperature: 0... 50°C (32... 122°F);
Storage temperature: -30... 70°C (-22... +158°F);
Humidity: 20... 85% RH, not condensing.

7.2 – MECHANICAL CHARACTERISTICS

Case: Plastic, self-extinguishing degree: V-0 according to UL 94;
Dimensions: 48 x 48, depth 75.5 mm, (1.77 x 1.77 x 2.97 in.)
Weight: 180 g max.
Installation: panel Insert in hole 45 x 92 mm
Connections: Terminal strip for a section 2 x 1 mm^2
Front protection: IP 65 (when the optional panel gasket is mounted) for indoor locations according to EN 60070-1;
Storage and transport temperature: -10 ... 60 ° C

7.3 – MECHANICAL DIMENSIONS, PANEL DRILLING AND FIXATION [mm]

DIMENSIONS



PANEL CUT-OUT

- QB 32 (L x H): 29 x 71 mm
- QB 48 (L x H): 45 x 45 mm
- QB 98 (L x H): 45 x 90 mm

7.4- FREQUENT QUESTIONS:

- **¿How do I set the analog output?**

Enter the Out" folder and go to o1t parameter. In this parameter we choose what kind of output we wish. (0-10V, 4/20 mA etc).
Go to o1F parameter and choose what kind of output we wish. (Regulation, retransmission, etc.).
In case that we want rebroadcast for example the input value, we have to indicate the start and end of the scale in the parameters Ao1L and Ao1H.
Example:
We want rebroadcast the input value for output 4/20 mA. The output value we want 0 to 100°C.
Set:
O1t= 4.20
O1F= r.inP
Ao1L= 0
Ao1H= 100

- **¿How do Autotuning?**

Although there are several ways to activate a Autotuning, we will explain how to do that properly we recommend autotuning and not having to do it repeatedly:

1- Setting the equipment and establish the normal Set Point working or which is used more.
2- Go to the Auto parameter, which is in the rEG folder and establish this parameter to 5.
3- Turn off the equipment power supply (not stand-by) and back on.
4- The equipment will start the Autotuning (indicating LED flashing). Will be doing tests to calculate the PID.
It is possible that during autotuning the temperature is exceeded during 2 or 3 times, do not be alarmed.
Depending on the auto-tuning process will last more or less time.
5- When the led of the autotuning turns off, autotuning is complete. Go back to the auto parameter and check that is in 0, if not set it yourself.

- **¿How do I set PT100 typical configuration probe, heat output for SSR + high temperature alarm?**

As we explained in several previous points, the fastest, convenient and effective way to set up your computer is to use the CODE EXPRESS. Then explain how to set this typical application:

1- Press Enter key for about 3 seconds.
The upper Display show “PASS”.

2- Using the buttons and enter the password 300 snd press Enter.

With the buttons and enter the code “0711” (This code in the table of CODE EXPRESS wants to say, input PT 100 and output HEAT for SSR)

Then enter in code 2 as 2000 (this code in Code express wants say absolute maximum alarm 1)
Once configured the express code will only be necessary to establish the desired SP, the maximum alarm desired and make a Autotuning and the equipment will be totally configured.

- **¿ ow set a typical ramp to make the following function? (ONLY AVAILABLE IN RAMPS MODELS)**

  - **SP1 = 60°C, maintenance 1 hour**
  - **SP2 = 40 ° C (1 ° C / min), maintenance 2 hours**
  - **SP3 = 100 ° C (2 ° C / minute), maintaining 5 hours**
  - **At the end of Stand-By program and start for push-button**

Go to the folder of ramps **“PRG”**.
The first parameter "Pr.F" selected as you wish that start the program of ramps, in this case "u.diG = Stand-By with start by button / push".

For the "Pr.S1, Pr.S2 and Pr.S3" parameters, enter 60, 40 and 100. (These are the values of each of the SET POINTS)

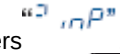
The parameters Pr.G1, Pr.G2, Pr.G3 Pr.G4 we indicate if we want the ramps are made by degrees / minutes, in case you do not wish to do a controlled ramp, be introduced the value inf. Since we want to arrive to SP2 by 1 grade/minute and SP3 to 2 degrees minute, we introduce in the parameter "Pr.G2" = 1 and in the parameter "Pr.G3"= 2.

Before introduce the maintenance time of the ramps, it is important that you first you entroduce the time to perform (hours or minutes) in the "Pr.u" parameter. In this case, in the parameter it selected option "hh.nn" (hours and minutes) is selected. Then in the parameters "Pr.t1, Pr.t2, Pr.t3", enter 01.00, 02.00 and 05.00 respectively.

- **¿How do I move the parameters to USER level to quickly change the desired parameters?**

Do the following:

1. Press the key for more of 3 seconds.
2. The upper display show “PASS” while that the low display show “0”.
3. Press the key or , and enter with password -81.
4. Press the key .

The equipment shows the name of the first folder of configuration parameters  .

5. By the button select the parameter folder you want to promote, in this case the parameter **“PRG”**.
6. By the button select the parameter.
7. The upper display will show the parameter name and the lower display will show your current level of promotion. The promotion level is defined by a letter followed by a number:

c: The letter shows that the parameter is accessible only from PROGRAMMER level (PASSWORD 30). In this case the number is forced to zero.
A: The letter shows that the parameter is in the level of OPERATOR (PASSWORD 20).
o: the letter shows that the parameter is in the USER level. The number that shows is the position where you wish that are displayed the parameter.

Example: If we want that first show parameter AUTO and followed SP, we must introduce in AUTO = o1 and SP= o2

To change the USER level the parameter, or what is the same to the letter "**o**", enter in desired parameter and press the key "PISANI + the key up ". Thereby the lower letter changes from "**A**" to "**o**". Only lack establishes the desired number and be programmed.